Mid-Decade Strategic Review of BEA's Economic Accounts

Background Papers

U.S. DEPARTMENT OF COMMERCE
ECONOMICS AND STATISTICS ADMINISTRATION
BUREAU OF ECONOMIC ANALYSIS

This is a supplement to the Mid-Decade Strategic Review articles published in the SURVEY OF CURRENT BUSINESS in February and April 1995 and reprinted in September 1995. This volume contains the seven background papers that are the foundation of the two articles and is made available for the information of BEA staff members and interested professionals.

Mid-Decade Strategic Review of BEA's Economic Accounts

Background Papers

In 1995, BEA undertook a Mid-Decade Strategic Review of its economic accounts. This volume presents the seven background papers that evaluate the state of the accounts and are the foundation of the strategic plan introduced in two SURVEY OF CURRENT BUSINESS articles that are available in a reprint from BEA.

J. Steven Landefeld, Acting Director of BEA, headed the review project. He and Carol S. Carson, former Director of BEA, were the principal authors of the background papers. Robert P. Parker, BEA's Chief Statistician, developed the consolidated menu of proposals to maintain the accounts. This menu, which is presented in the seventh and final paper, was based on the findings of the first six background papers. For the first six papers, the contributing authors and their areas of responsibility were as follows: Bruce T. Grimm, revisions and their implications for improvements in the accounts; Stephanie L. Howell, outside recommendations; John S. Pitzer, international guidelines for national accounts; Obie G. Whichard, international guidelines for international accounts; and Robert Yuskavage, response of the accounts to economic change. Gerard P. Aman and Chris W. Garner produced the graphics. The following staff reviewed the drafts and provided useful suggestions: Gerald F. Donahoe, Associate Director for National Income, Expenditures, and Wealth Accounts; Hugh W. Knox, Associate Director for Regional Economics; Gerald A. Pollack, Associate Director for International Economics; and Jack E. Triplett, Chief Economist. Teresa A. Price, provided administrative and production support. Other support was provided by C. Brian Grove, Frank A. Szumilo, and Helen S. Tice.

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MID-DECADE STRATEGIC REVIEW

OF BEA'S

ECONOMIC ACCOUNTS

Background Papers

Paper I: Introduction and Executive Summary

Bureau of Economic Analysis
Economics and Statistics Administration
United States Department of Commerce

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I. Introduction and Executive Summary

A comprehensive review of the U.S. economic accounts produced by the Bureau of Economic Analysis (BEA), U.S. Department of Commerce, is underway. The review is intended to evaluate the performance of the economic accounts in achieving BEA's goal: Providing its customers with the right numbers at the right time as measured by accuracy, reliability, and relevance. This review is one of the three pillars that will be used in developing BEA's strategic plan for the next decade. The other two are a benchmarking of BEA's information technology system that will be used to re-engineer BEA's data collection, processing, and dissemination and a customer survey that is being used to develop and improve customer service standards at BEA.

The first step in the review was the preparation of a series of background papers to evaluate the state of the economic accounts at mid-decade--their problems and prospects for improvements. These papers end with a menu of recommendations for addressing the problems that are identified. The next step is to go from a menu to a prioritized agenda, or plan, for moderntzing and improving the economic accounts over the next decade. The plan will be published in BEA's <u>Survey of Current Business</u> in February 1995. As the third step, the plan will be discussed and refined in a process that includes public comment and a meeting of users of the accounts in March 1995.

The background papers consist of this introduction and executive summary and the six papers that follow. This paper serves two purposes. First, it sets the stage for the review by describing earlier reviews that serve as models for the review's scope and approaches, introducing BEA's economic accounts and their uses, and sketching the role of source data and estimating methods. Second, as an executive summary, it introduces the cross-cutting themes that emerge from the review and the menu of recommendations that are related to the themes.

Past Reviews of the Accounts as Models

A series of comprehensive reviews of the economic accounts have provided guideposts in past decades. These reviews have evaluated the performance of the accounts in terms of their ability to capture changes in the economy and present them in a timely manner, to respond to the suggestions of users and expert groups interested in the accounts, and to adapt to changes in source data, statistical methods, and economic accounting. These reviews also evaluated the accuracy of the accounts through some combination of revision and other statistical studies. Finally, they included a set of recommendations for improvements in the accounts.

In the 1950's, there were two major reviews of the accounts. The first, <u>National Economic Accounts of the United States: Review, Appraisal, and Prospects</u>, was prepared by the National Accounts Review Committee of the National Bureau of Economic Research at the request of the Bureau of the Budget (predecessor of the Office of Management and Budget) in 1957. The

Committee was chaired by Raymond Goldsmith, and the members included Richard Easterlin, Joseph Pechman, and Richard Ruggles. The report was presented at a hearing of the Subcommittee on Economic Statistics of the Joint Economic Committee. The second volume, Critique of the United States Income and Product Accounts, 1958, was the result of a symposium on the accounts held by the Conference on Research in Income and Wealth, which has functioned as a research forum for work on economic measurement. These reviews dealt with many of the emerging issues of the time, many of which related to the expansion in the complexity and scope the accounts necessary to portray accurately the U.S. economy. Other issues were basic conceptual issues, such as the treatment of capital gains and coverage of nonmarket production and consumption, and the need for better integration of the income and product, flow of funds, and other components of the existing accounts.

In 1971, BEA published The Economic Accounts of the United States: Retrospect and Prospect. This volume, on the occasion of the fiftieth anniversary of the Survey of Current Business, was a series of 43 papers contributed by some of the country's most prominent economists, including past and future Federal Reserve Board chairs (Arthur Burns and Alan Greenspan), Nobel laureates (Wassily Leontief, Simon Kuznets, Lawrence Klein, and Paul Samuelson), Council of Economic Advisers chairs (Arthur Okun and Raymond Saulnier), and American Economic Association presidents (Robert Eisner, Robert Gordon, and Charles Kindleberger). BEA catalogued and prioritized the suggestions from these papers, and George Jaszi, BEA's Director, responded.

In 1977, OMB released the Gross National Product Data Improvement Project Report. This report was prepared by the Office of Management and Budget (OMB) Advisory Committee on GNP Data Improvement. The committee was chaired by Daniel Creamer, and the members were Rosanne Cole, Edward Denison, Raymond Goldsmith, Alan Greenspan, and John Kendrick. The report, later often referred to as the Creamer Report, was undertaken as a result of concerns over relatively large revisions in the GNP accounts in the early 1970's and focused on needed improvements in the source data, rather than on the needed extensions and conceptual modifications.

In 1979, the Conference on Research in Income and Wealth addressed several aspects of the national income and product accounts (NIPA's) revolving around the accounts as a system of information pertaining to the behavior of the economy. The topics included the concepts and structure of the accounts, the issues involved in deflation and the treatment of quality change in price indexes, and source data. The last topic included an evaluation of major parts of the Creamer Report.

In 1982, the General Accounting Office (GAO) published The Bureau of Economic Analysis Should Lead Efforts to Improve GNP Estimates. This study was intended to evaluate revisions of GNP estimates and to prioritize the Creamer Report's 155 recommendations for improving the accounts made to 24 Federal agencies. It too focused more on statistical than conceptual issues.

Since the GAO study, there has been much attention focused on the quality of the economic statistics, but there has been no broad review of the economic accounts[1]. There have been numerous revision studies, forecast studies, case/event studies, and expert group studies of various aspects of the economic accounts, but nowhere have these pieces of work been pulled together to form a cohesive picture of needed improvement in BEA's economic accounts.

Given the pace of change in the economy, a comprehensive review is overdue. Such a review is needed to provide a framework to carry the accounts forward into the next decade. It should draw on a full range of information, including the following::

- o The effect on the structure of the accounts of changes in the economy in the 1980's and 1990's: for example, deregulation and innovation in financial and communication markets, the surge in foreign investment, rapid growth in services, and the rapid growth and change in the prices and characteristics of computers and other "high-tech" products.
- o Recommendations by groups such as the National Academy of Sciences, the National Association of Business Economists, the International Monetary Fund (IMF), and the GAO.
- o Updated international guidelines in economic accounting, mainly the System of National Accounts (SNA) and the IMF's Balance of Payments Manual.
- o Changes in technology and deregulation, and their effect on data collection and source data availability.
- o Revisions and gaps in key components of GDP and the other accounts.

BEA's Accounts and Their Uses

The U.S. economic accounts assemble a wide range of diverse economic data into a system of accounts that provide a complete and consistent picture of the national economy and its international and regional dimensions. The accounts are guided by concepts--such as the concepts of income, consumption, and investment and of current and capital accounts--and they are designed to be complete in the sense that they present all transactions or holdings, but do not double count. The estimates in the accounts are designed to be consistent with respect to valuation, timing, and coverage. The accounts resemble the income and balance sheet accounts that describe the operations of a business enterprise, providing summary measures and supporting detail. The

[1] Indeed, the last comprehensive review that covered all the accounts was by the 1957 National Accounts Review Committee.

best known of BEA's accounts are the national income and product accounts (NIPA's), balance of payments accounts, and regional accounts.

NIPA's

Although the NIPA's are an entire system of accounts, they are best known by the summary measure, gross domestic product, or GDP, which measures the market value of the goods and services produced in the United States. (See box 1.) On the product side, this measure is the total of final sales plus the net change in inventories (goods that have been produced but not yet sold). (The focus is on final sales to avoid double counting intermediate purchases and sales by business.) The income side of the account is the sum of costs and profits associated with producing GDP, including compensation of employees, interest, depreciation, and profits. As is the case on the product side of the ledger, the costs of purchased inputs are not included to avoid double counting income earned in producing those intermediate products.

The system of accounts not only details the relationship between income and product, but traces the principal economic flows among the major sectors of the economy. The NIPA's are among the Nation's essential statistics and have been described as "the mainstay of macroeconomic analysis," helping to provide answers to questions such as:

Box I.1 -- GDP and GNP

These background papers refer to both gross domestic product (GDP) and gross national product (GNP). GNP equals GDP plus incomes, mainly on investments, earned abroad by U.S. residents less similar incomes earned in the United States by foreign residents. The background papers usually refer to GDP because it is now BEA's featured measure; however, in context-specific situations, such as summarizing the outside evaluations of the accounts, they retain the measures referred to in the original.

BEA changed its featured measure of production from GNP to GDP at the time of the comprehensive revision of the NIPA's released in late 1991. GDP, as a measure of the goods and services produced by labor and property located in the United States, is more appropriate for most short-term monitoring and analysis of the U.S. economy, particularly when there is need to be consistent in coverage with indicators such as employment. Further, because GDP is the measure used by most other countries, its use facilitates comparison of economic activity in the United States with that in other countries. GNP is a measure of the goods and services produced by labor and property supplied by U.S. residents. It continues to be a useful concept because it refers to income available to U.S. residents as a result of their contribution to production and thus is appropriate for analyses related to sources and uses of income.

- How much has the Nation's production, as measured by GDP, grown in the last quarter, the last year, the last decade?
- How much have prices increased over the same periods?
- How much have standards of living, as measured by real personal income per capita, grown in the last decade?
- How much of GDP goes for investment? How does the U.S. investment rate compare to that of other nations?
- How much of personal income goes to purchase goods and services? to pay taxes? for saving?

Balance of payments accounts

Like the NIPA's, the balance of payments accounts are a system of accounts, and they too are best known by their summary measures, the current account balance and the trade balance. The entire system of accounts provides information on international transactions in goods, services, investment income, government aid, and the financial flows that finance these transactions. The system also provides integrated balance sheet information on the U.S. international investment position (IIP). The balance of payments accounts assist in answering questions such as:

- How large is the U.S. deficit in trade in goods? how large is the surplus in trade in services? the surplus or deficit in investment income?
- How much do rates of return to foreign-owned companies in the United States compare with the rates of return to U.S.-owned companies abroad?
- How much do foreigners have invested in the United States? How much does the U.S. have invested abroad?

Regional economic accounts

BEA's regional accounts are an extension of BEA's national accounts that provide estimates of gross state product (GSP) and of total and per capita personal income by region, State, metropolitan area, and county. These accounts provide consistent estimates that are used by State revenue offices, by Federal agencies in allocation formulae for over $90 billion in Federal funds annually, and by private industry for market analysis and plant location studies. Regional accounts are useful in answering questions such as:

- Which regions had the fastest growth in per capita income in the last decade? the slowest growth?

- In which States are the share of residents' incomes from earnings components such as wages highest? from dividends, interest, and rent? from transfer payments such as social security?

- Is GSP from manufacturing becoming less concentrated geographically? In which States are "high-tech" industries growing the fastest?

Other accounts and data

In addition to its best-known economic accounts, BEA produces the following sets of statistics that are related to the accounts just mentioned.[2]

- Input-output (I-O) accounts: These national accounts detail the interaction, or interdependencies, of detailed industries. They allow users to track the effects of changes in resources costs, or changes in final demand, on specific industries, on the users of these industries' products, and on suppliers of labor and other products to these industries. These accounts present answers to questions such as:

    - How much of domestic manufacturing industries' inputs are from other domestic manufacturing industries? are from domestic service industries? are imports?

- Wealth accounts: BEA produces estimates of the Nation's reproducible tangible wealth in the form of nonresidential structures and equipment, residential structures, consumer durable goods, and inventories. These accounts detail the U.S. capital stock by type of stock, by industry, and by legal form of ownership. They help answer questions such as:

    - Over the last decade, how much has the nation's infrastructure, as measured by the stock of fixed capital, grown? how does this compare to past rates of capital formation? to other countries? How much of the slowdown is accounted for by government vs. business capital formation?

- U.S. direct investment abroad and foreign direct investment in the United States: BEA has the most detailed data set on the operations of foreign-owned companies among the major industrialized nations of the world. This information is used to estimate investment income and capital flows for the balance of payments accounts and holdings for the IIP and, as a stand-alone data set, helps answer frequently asked questions such as:

    - What percentage of the U.S. workforce is employed in foreign-owned companies?

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[2] BEA also maintains a system of composite indicators to track the business cycle. The best known of these indicators is the "leading index," often referred to by the media as the Government's major forecasting tool.

- Which countries account for the largest share of foreign direct investment in the United States?

- In what countries do U.S. companies invest? Are they high-wage or low-wage countries? What share of U.S. exports and imports are accounted for by trade between U.S. companies and their foreign subsidiaries?

Source Data and Methods for the Accounts

The accounts are built up as a mosaic from a variety of source data and estimating methods. Source data are the facts and figures BEA uses to prepare the estimates, and estimating methods are the steps BEA takes to transform these data into its estimates. With few exceptions, the data are collected for purposes other than the preparation of the income, product, and other estimates and come from a variety of sources. Consequently, the estimating methods must be diverse as well to yield consistent concepts, definitions, and timing.

NIPA's

In general, the most comprehensive source data are available at the 5 year intervals associated with the economic censuses conducted by the Census Bureau. The economic census data are used to "benchmark" BEA's estimates for the quinquennial census years--for example, 1987, 1982, and 1977. The source data become progressively less complete and consistent as one moves from the benchmark to the annual, and then to the advance, or first, quarterly estimates of GDP. For example, early tabulations of Census Bureau reports from a monthly sample of retail establishments are used to produce the advance estimates of quarterly final sales to consumers (part of personal consumption expenditures in GDP). These estimates are revised as more reports become available from the monthly samples. The annual surveys are drawn from a larger sample and provide more detailed information, and the 5-year Census of Retail Trade provides the most comprehensive and detailed data which is, in turn, used as a universe to draw new sample frames for the monthly and annual surveys. In essence, the Census data are used to provide both the appropriate level for GDP and the sample frame for the estimates used to extrapolate (and interpolate) GDP in the nonbenchmark years and quarters.

For any given quarter--and for any given component of GDP--a number of different data sources and methods are used to arrive at an estimate. BEA regularly publishes its source data and methods; an excerpt of this documentation for personal consumption expenditures is included in the appendix of this paper. For example, 3 months of preliminary retail trade data from the Census Bureau are available to estimate sales of certain goods to consumers. ("Other goods" are estimated from a wide range of data, such as unit sales and average retail prices of autos and trucks available from trade sources.) Consumer spending on services is estimated from BEA and Census Bureau data on housing stocks and average rent, Bureau of Labor Statistics (BLS) data on services employment, National Oceanic and Atmospheric

Administration degree day data and average utility costs, and trade source data on selected services receipts. All of these data must be adjusted to NIPA concepts and definitions. These adjustments include additions for dealers' trade margins on used cars and the exclusion of used car sales (the dealers' services in selling the used car represent current production whereas the used car is simply a preexisting asset that undergoes a transfer in ownership); additions for goods and services furnished without explicit charge to consumers, such as food furnished to employees or "interest-free" checking; and additions for purchases by U.S. residents abroad and subtractions for foreign residents' purchases in the United States.

As mentioned, source data for the estimates of the NIPA's come from a variety of sources. Data collected by Federal Government agencies provide the backbone of the estimates, although as in the case of personal consumption expenditures (PCE), they are supplemented by data from trade associations, businesses, organizations, and other private sources. Of the relatively few items for which BEA itself collects data, most refer to international transactions. These include international trade in services and direct investment by foreigners in the United States and by U.S. residents in foreign countries. The sources of data for each component of GDP are published as part of the annual and benchmark revisions of the accounts[3].

Other accounts

The other BEA accounts are built up from source data in a similar way. For the regional accounts, data must be found that either are available by State or smaller division and add up to a reliable national total, as the wage and salary data, or that can be used to allocate a national total. Of particular concern is the distinction between data that are on a place-of-residence basis (such as receipts of dividends, interest, and rental income) and data that are on a place-of-work basis (such as wages and salaries, other labor income, and proprietors' income). For the international accounts, data must be found that distinguish between transactions and holdings of residents and nonresidents, with a particular interest in the geography for the nonresidents.

Themes that Emerge from this Review

Several themes emerge from this comprehensive review of the economic accounts. Not surprisingly, these themes cut across the subjects of the background papers. For example, certain changes in the nature of the economy may be referred to in all papers because they will have led to gaps in coverage, problems with existing source data and methods, as well as

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[3] For a review of source data and methods used to prepare GNP, see Carol S. Carson, GNP: An Overview of Source Data and Methods, Bureau of Economic Analysis Methodology Papers, Washington, D.C.: GPO, September 1987.

significant revisions. They are also likely to be the focus of current policy interest and be the subject of outside experts' recommendations.

Change in the nature of output and the organization of production: The need for new output and price measures

Changes in the nature of output have caused significant problems for existing output and price measures. As Chairman Greenspan of the Federal Reserve Board stated, "the output of goods and services is becoming more conceptual than physical over time." As increases in output have increasingly been in the form of increased quality rather than quantity, if price measures do not distinguish quality from quantity changes, measures of price per unit of physical output tend to overstate price increases. If price measures are overstated, the measure of real (price adjusted) GDP will be understated as will measures of productivity change and the economy's long-term non-inflationary growth rate. In recent years, concern has grown about the possibility that existing output and price measures are, in fact, significantly biased because they do not adequately capture the effect of quality changes.

Changes in the composition of output have also caused problems as newly emerging services and new goods have opened gaps in the coverage of existing surveys, methods, and classification systems. Sample frames for retail trade become outdated as, for example, "wholesale" outlets account for an increasing share of direct sales to consumers. Rapidly growing segments such as exports of international financial services and computer software are undercounted, while products such as LP records are fully recorded.

Rapid changes in output and prices also cause problems for statistical methods, such as fixed-weighted output and price indexes, that were designed for a time when changes were less rapid and updating such indexes once every 5 years was sufficient.

Finally, changes in the structure and organization of the economy threaten to decrease the accuracy, reliability, and relevance of the economic accounts. Source data for existing measures have become obsolete due to changes in the production, delivery, and consumption of products. Changes in the importance of the environment, government, and innovation are not adequately captured in the accounts, and there are limitations in accounting for the interaction between the economy and the environment and the role of government and of research and development (R&D).

Investments in the future: The need for better measures of investment and capital stocks

Changes in the economy have also increased the need for broader and more reliable measures of investment and capital stocks. For example, changes in technology call for broader coverage of products, such as computer software, whose investment-like properties are increasingly apparent. At the same time, integration in world financial markets and the effect of changes in wealth on consumer spending, investment, and international capital flows have increased the importance of integrated real and financial transaction and stock accounts for macroeconomic analysis.

There are long-standing problems with measures of depreciation, capital stocks, and inventories. While BEA's straight-line depreciation and capital stocks at replacement cost were a significant improvement over tax-based estimates at historical cost when they were introduced in the 1970's, an overhaul of these estimates is overdue. BEA's estimates of inventories continue to be a major source of revisions and problems for business cycle analysts.

Internationalization: The need for measures to fill gaps in coverage

One of the most obvious aspects of economic change affecting the accounts is the international integration of markets. The integration of world capital markets has significantly increased monetary and regulatory authorities' interest in accurate and complete information on capital flows. At the same time, the integration of markets for goods and services has increased business and trade officials' interest in newly emerging goods and services.

Unfortunately, while increased integration has increased the importance of such data, it also increased the difficulty of measuring such transactions. Gaps have developed in the coverage of newly emerging categories of international trade in services and goods, in the coverage of derivatives and other new financial instruments, and in the coverage of security and other portfolio transactions that bypass U.S. brokers, banks, and other financial institutions. Change in the structure of international markets has also resulted in outdated and incomplete source data for existing measures of goods and services.

Addressing the Needs Identified in the Cross-Cutting Themes

A menu of recommendations for addressing the statistical needs identified in this review emerges. The detailed recommendations are described in paper VII; highlights from these recommendations as they relate to the cross-cutting themes are listed below.

Change in the nature of output and the organization of production: The need for new output and price measures

Extension of BEA's work on quality adjustments through the development of hedonic price measures for high-tech goods--such as semiconductor manufacturing equipment and telecommunications equipment--and services would be useful. To address problems associated with rapidly changing prices and substitution bias, new measures of real output that feature more frequently updated base period weights need to be developed.

In other areas, there is a need for the following:

- New concepts and measures of output in sectors such as banking, insurance, and other financial services;
- New and expanded surveys to cover gaps in areas such as services, wholesale trade, construction, computer software, hours and earnings, and profits;
- New quarterly surveys to provide quarterly data on key GDP components, such as State and local purchases and consumer spending on medical care and other services, subject to large revisions;
- Development and implementation of a new economic classification system (the North American Industry Classification System);
- More frequent updating of sample frames for births and deaths of firms in the retail trade and other key surveys;
- Improved coverage of items such as bonus payments and purchased inputs.

The move toward the new SNA and associated satellite accounts will address many issues associated with change in the structure of the economy. Among them are the following:

- A more comprehensive accounting for government;
- Better integration between the I-O, national, international, and regional accounts and the sectors within the various accounts;
- Increased integration between the nonfinancial and financial accounts;
- Extension of BEA's integrated economic and environmental satellite accounts and the R&D satellite accounts.

<u>Investments in the future: The need for better measures of investment and capital stocks</u>

Work in this area will involve expanding the scope of investment and capital stock, while at the same time improving existing measures. This work will include the following:

- Treatment of software and some other intangibles as investment;
- Accounting for government investment and capital stocks;
- Improved accounting for contingent claims and other new financial instruments;

- Increased integration between the Federal Reserve Board's flow of funds accounts and BEA's NIPA's;
- Improved measures of capital and depreciation;
- More frequent updating and expansion of surveys covering inventories.

<u>Internationalization: The need for measures to fill gaps in coverage</u>

Recommendations in this area call for the following:

- New measures of derivatives and other new financial instruments;
- Expanded and coordinated international collection and exchange of data on security, banking, and other transactions that bypass domestic brokers, banks, and other financial institutions;
- Completion and institutionalization of portfolio investment benchmarks and other methods for assuring complete coverage of portfolio investment and consistent coverage between portfolio and direct investment;
- New quarterly surveys of rapidly expanding services now covered by BEA's annual-only surveys;
- Expansion of BEA's existing surveys to cover newly emerging gaps in international trade services;
- Improvements in source data and methods to provide better coverage of exports and imports of computer software and other goods and services.

Subcomponent (billions of dollars) of personal consumption expenditures, which was $4,378.2 billion in 1993	Annual estimates: Source data and methods used to determine level for benchmark and other final years or, for other years, used to prepare an extrapolator or interpolator	Advance quarterly estimates: Source data and methods used to prepare an extrapolator
Durable and nondurable goods: ($1,877.2)[1]		
Most goods (goods except subcomponents listed separately) ($1,562.0)	Benchmark years--Commodity-flow method, starting with manufacturers' shipments from Census Bureau quinquennial census and including an adjustment for exports and imports from Census Bureau merchandise trade. Other years--Retail-control method, using retail trade sales from Census Bureau annual survey or, for most recent year, monthly survey of retail trade.	Same as annual for most recent year.
New autos ($93.4)	Physical quantity purchased times average retail price: Unit sales, information with which to allocate sales among consumers and other purchasers, and average list prices, all from trade sources.	Same as annual.
Net purchases of used autos ($45.9)	Benchmark years--For net transactions, change in the consumer stock of autos from trade sources. For dealers' margin, retail sales from Census Bureau quinquennial census and margin rate from Census Bureau annual survey of retail trade. Other years except most recent--For net transactions, same as benchmark. For dealers' margin, franchised dealers' unit sales times sales price, both from trade sources, times margin rate for independent dealers from Census Bureau annual survey; independent dealers' margin from Census Bureau annual survey. Most recent year--For net transactions, same as benchmark. For dealers' margin, for franchised dealers, unit sales and sales price from trade sources; for independent dealers, sales from Census Bureau monthly survey of retail trade.	For net transactions, residual based on net sales by other sectors. For dealers' margin, unit sales of franchised dealers from trade source and sales price from Bureau of Labor Statistics consumer price index for used cars. Same as annual for most recent year.
New trucks ($52.3)	Benchmark years--Commodity-flow method, starting with manufacturers' shipments from Census Bureau quinquennial census and including an adjustment for exports and imports from Census Bureau merchandise trade. Other years except most recent--Abbreviated commodity-flow method, starting with manufacturers' shipments from Census Bureau annual survey and including an adjustment for exports and imports from Census Bureau merchandise trade.	

Subcomponent (billions of dollars) of personal consumption expenditures, which was $4,378.2 billion in 1993	Annual estimates: Source data and methods used to determine level for benchmark and other final years or, for other years, used to prepare an extrapolator or interpolator	Advance quarterly estimates: Source data and methods used to prepare an extrapolator
	Most recent year--Physical quantity purchased times average retail price: Unit sales and information with which to allocate sales among consumers and other purchasers from trade sources and average price based on Bureau of Labor Statistics consumer price index for new trucks.	
Gasoline and oil[3] ($105.6)	Benchmark years--Physical quantity purchased times average retail price: Gallons consumed from the Department of Transportation, information with which to allocate that total among consumers and other purchasers from Federal agencies and trade sources, and average retail price from Census Bureau quinquennial census. Years except most recent--Same as benchmark years, except average retail price from the Energy Information Administration. Most recent year--Physical quantity purchased times average retail price: Gallons consumed and average price both from the Energy Information Administration.	Same as annual for most recent year.
Food furnished to employees (including military) ($12.0)	Benchmark years--For commercial employees, number of employees of appropriate industries from Bureau of Labor Statistics tabulations times BEA estimate of per capita expenditures for food; for military personnel, outlays from the Budget of the United States prepared by the Office of Management and Budget. Years other than benchmark years--Same as benchmark years, except per capita expenditures for food based on Bureau of Labor Statistics consumer price index for food.	For commercial employees, same as annual for years other than benchmark years; for military personnel, judgmental trend.
Expenditures abroad by U.S. residents ($3.2) less personal remittances in kind to nonresidents ($0.8)	Estimated as part of the balance of payments; see the entry for service exports and imports, net, under net exports of goods and services.	Judgmental trend.
Services: ($2,501.0)		
Nonfarm dwellings--space rent for owner-occupied and rent for tenant-occupied ($598.5)	Benchmark years--Based on data on housing stock and average annual rent from Census Bureau decennial census of housing and survey of residential finance. Other years--Based on data on housing stock and average annual rent from the Census Bureau biennial housing survey or on the number of households from Census Bureau monthly current population survey and Bureau of Labor Statistics consumer price indexes for rent.	Same as annual: For housing stock, judgmental trend; for average rent, Bureau of Labor Statistics consumer price indexes for rent.

Subcomponent (billions of dollars) of personal consumption expenditures, which was $4,378.2 billion in 1993	Annual estimates: Source data and methods used to determine level for benchmark and other final years or, for other years, used to prepare an extrapolator or interpolator	Advance quarterly estimates: Source data and methods used to prepare an extrapolator
Rental value of farm dwellings ($5.6)	Benchmark years--Based on data on housing stock and average annual rent from Census Bureau quinquennial census and decennial census of housing and survey of residential finance. Other years--Based on data on net value of farm housing stock from BEA capital stock series.	Judgmental trend.
Motor vehicle and other repair, other purchased intercity transportation, legal and funeral services, barbershops and beauty parlors, nursing homes, laundries, employment agency fees, accounting and tax return preparation services, recreation (except video cassette rentals, cable TV, casino gambling, parimutuel net receipts, and lotteries), hotels and motels, and other education and research ($407.6)	Benchmark years--Receipts and expenses from Census Bureau quinquennial census adjusted for receipts from business and governments. Other years--Receipts, for spectator sports from trade sources, for legitimate theaters and other education and research from tabulations of wages and salaries of employees covered by State unemployment insurance from the Bureau of Labor Statistics, for others in this group from Census Bureau service annual survey.	For nursing homes, other education and research, employment agency fees, and clubs and fraternal organizations, wages and salaries derived from Bureau of Labor Statistics monthly employment times earnings times hours; for legitimate theaters and motion pictures, receipts from trade sources; for radio and TV repair, number of TV's based on stock and sales from trade source times Bureau of Labor Statistics consumer price index for appliance and furniture repair; for others in this group, judgmental trend.
Physicians, dentists, and other professional medical services ($287.4)	Benchmark years--For nonprofit professional services, expenses; for others in this group, receipts, adjusted for government purchases, from Census Bureau quinquennial census. Other years--Receipts and revenues, adjusted for government purchases, from Census Bureau service annual survey.	For physicians and dentists, judgmental trend; for other professional medical services, wages and salaries derived from Bureau of Labor Statistics monthly employment times earnings times hours.
Private nursery, elementary, and secondary schools, day care, welfare activities, and trade unions and professional associations ($121.9)	Benchmark years--For religious-affiliated schools, enrolment from the Department of Education times BEA estimate of average expenditures per pupil; for nursery schools and day care, expenditures from Bureau of Labor Statistics consumer expenditure survey; for others in this group, receipts and expenses from Census Bureau quinquennial census. Other years except most recent--For nursery schools and day care, same as benchmark years; for others in this group, annual tabulations of wages and salaries of employees covered by State unemployment insurance from the Bureau of Labor Statistics. Most recent year--For nursery schools and day care, judgmental trend; for others in this group, tabulations of wages and salaries of employees covered by State unemployment insurance from the Bureau of Labor Statistics.	For political organizations and foundations, judgmental trend; for others in this group, wages and salaries derived from Bureau of Labor Statistics monthly employment times earnings times hours.
Financial services furnished without payment by banks, credit agencies, and investment companies[3] ($146.2)	See entry for net interest: Imputed-banks, credit agencies, and investment companies.	Judgmental trend.

Appendix to Paper I.--Principal Source Data and Estimating Methods Used in Preparing Current-Dollar Estimates of GDP: An Excerpt for Personal Consumption Expenditures--continued

Subcomponent (billions of dollars) of personal consumption expenditures, which was $4,378.2 billion in 1993	Annual estimates: Source data and methods used to determine level for benchmark and other final years or, for other years, used to prepare an extrapolator or interpolator	Advance quarterly estimates: Source data and methods used to prepare an extrapolator
Brokerage charges and investment counseling, bank service charges, intercity transportation except other, and private higher education ($126.4)	Years except most recent--For private higher education, expenses, and for others in this group, receipts, all from annual reports of government administrative agencies. Most recent year--For brokerage and bank service changes and intercity transportation, receipts from reports of government administrative agencies; for private higher education, enrollment from the Department of Education times price index for higher education from trade source.	For stock brokerage charges, stock exchange transactions from trade sources; for income from sale of investment company securities, sales of open-end investment company shares from trade source; for other brokerage charges and investment counseling and for bank service charges, judgmental trend; for intercity transportation, receipts from trade sources; for private higher education, wages and salaries derived from Bureau of Labor Statistics monthly employment times earnings time hours.
Domestic services ($11.5)	Benchmark years--For cleaning services, receipts from Census Bureau quinquennial census; for other domestic services, number of workers times weekly hours times earnings from the Bureau of Labor Statistics. Other years--Number of workers times weekly hours times earnings from the Bureau of Labor Statistics.	Judgmental trend.
Public higher education and hospitals, water and other sanitary services, and lotteries ($130.8)	Years except most recent--For lotteries, net receipts from Census Bureau quinquennial census and annual surveys of State and local governments, adjusted to a calendar year basis from a fiscal year basis; for others in this group, receipts from the same sources. Most recent year--judgmental trend.	Same as annual for most recent year.

Subcomponent (billions of dollars) of personal consumption expenditures, which was $4,378.2 billion in 1993	Annual estimates: Source data and methods used to determine level for benchmark and other final years or, for other years, used to prepare an extrapolator or interpolator	Advance quarterly estimates: Source data and methods used to prepare an extrapolator
Insurance, private hospitals, religious activities, cable TV, utilities, and local transport ($629.8)	Years except most recent--For life insurance, expenses from trade sources; for insurance other than life insurance, premiums and benefits from trade sources; for private hospitals, receipts and expenses from Census Bureau quinquennial census (benchmark year), expenses from trade sources (other years); for religious activities, expenses based on contributions and membership from trade sources; for cable TV and utilities, receipts from government agencies and trade sources; for local transport, receipts from trade source. Most recent year--For life insurance, tabulations of wages and salaries of employees covered by State unemployment insurance from the Bureau of Labor Statistics; for insurance other than life insurance, judgmental trend; for religious activities, expenses based on population from the Census Bureau and per capita disposable personal income from BEA; for local transport, passenger trips from trade source times Bureau of Labor Statistics consumer price index for intracity mass transit; for others in this group, same as other years.	For life insurance, hospitals, and religious activities, wages and salaries derived from Bureau of Labor Statistics monthly employment times earnings times hours; for electricity and gas, projected quantities based on degree day data from the National Oceanic and Atmospheric Administration times price based on Bureau of Labor Statistics consumer price indexes for utilities; for others in this group, judgmental trend.
Foreign travel by U.S. residents ($40.8) less expenditures in the United States by nonresidents ($68.5)	Estimated as part of the balance of payments; see the entry for service exports and imports, net, under net exports of goods and services.	Same as annual.
Other services: Video cassette rentals, casino gambling, and parimutuel net receipts; other housing except hotels and motels; bridge, etc., tolls; other household operation except repairs and insurance; travel and entertainment card fees; stenographic and reproduction services; and money orders and classified advertising ($63.1)	Various source data.	For casino gambling, receipts from State agency; for others in this group, judgmental trend.

1. Includes $3.6 billion for food produced and consumed on farms, standard clothing issued to military personnel, and used trucks.

2. The retail-control method cited under personal consumption expenditures (PCE) for most goods is based on retail trade sales data that include sales of gasoline service stations. Estimates of PCE for gasoline and oil are derived separately and are deducted from the retail-control totals (that include goods sold by gasoline service stations) to derive the estimates for PCE for most goods.

3. Also referred to as services furnished without payment by financial intermediaries except life insurance carriers and private noninsured pension plans.

Source: 1993 estimates--Survey of Current Business, July 1994.

MID-DECADE STRATEGIC REVIEW

OF BEA'S

ECONOMIC ACCOUNTS

Background Papers

Paper II: Economic Change and the Economic Accounts

Bureau of Economic Analysis
Economics and Statistics Administration
United States Department of Commerce

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II. Economic Change and the Economic Accounts

Overview

Over 50 years ago, when the U.S. economic accounts were originally constructed, they helped address issues such as how much production could be devoted to turning out the tanks, ships, and munitions needed in the war effort while still providing necessities for the civilian population. Since then, the accounts have been refined in concept and grown in scope as the economy's structure has changed and as policy has refocused to address issues ranging from inflation to the adequacy of capital formation.

Modernizing and extending the economic accounts is a continuous process. As this background paper demonstrates, in today's rapidly changing world economy, this process is more important than ever if the accounts are to provide a comprehensive and accurate picture of economic activity that is relevant to current economic issues. During the 1980's and 1990's, a number of structural changes in the economy required important adaptations in the economic accounts. These changes included deregulation and innovation in financial, communication, and transportation markets, the surge in foreign investment, rapid growth in services, and the rapid rate of growth and change in the prices and characteristics of computers and other high-tech products. BEA and the other statistical agencies have made significant progress in addressing many of these issues but, as this paper suggests, a significant portion of the agenda for change remains unfinished.

Relevance, Change, and Economic Accounts

One of the most important criteria for evaluating BEA's accounts is how well they have captured, or responded to, important economic developments and other issues of concern to economic policymakers. A set of accounts that is inflexible in the face of a dynamic economy, or that does not routinely provide the information needed for making policy, would fail the tests of both accuracy and relevance.

This paper focuses on important economic developments and the actions BEA has taken to maintain and improve the accuracy and relevance of its accounts in response to them. Major themes that are addressed will also be found in the papers that follow on outside experts' evaluations, analysis of revisions in the accounts, and the impact on the accounts of developments in source data and statistical methods. Issues related to the design of the accounts are addressed in a section on international developments in economic accounting.

The first two parts of this paper provide brief historical material that is a useful backdrop for more recent developments. The first part describes developments that shaped the accounts in their formative years during and immediately after World War II and then through the late 1950's. The second part highlights concerns that arose during the early 1960's about relatively sluggish economic growth and then later about inflation. The third part, which makes up most of this section, focuses on the period from the late 1970's through the present. This part primarily addresses three broad themes that have significantly affected both the U.S. economy and BEA's accounts: changes in the nature, composition, structure, and organization of economic activity; changes in the nature and importance of investment and capital; and increases in the degree of internationalization of the U.S. economy. The last part contains a summary.

The Formative Years

World War II and the early post-war era

When the United States entered the war in December 1941, the aggregate economic measures published by BEA's earliest predecessor organization--the Bureau of Foreign and Domestic Commerce--were annual estimates of national income and monthly estimates of "income payments." Key government officials realized they needed more estimates that would help them determine how much of the Nation's production capacity could be diverted to the war effort while maintaining a minimal level of consumer production.

Early in 1942, the Bureau published its initial annual estimates of gross national product (GNP) as the sum of consumption, investment, government purchases, and net exports. (See Table II.1 for a summary of developments in the economic accounts.) These estimates of production provided the starting point for an assessment of the unused capacity in the economy. The next step was to provide measures of constant-dollar, or "real," GNP that could be compared with measures of the Nation's capacity to produce real output. Such estimates were provided later in 1942, along with estimates for government war expenditures and government nonwar expenditures.

In 1943 and 1944, the Bureau rapidly expanded its regularly released estimates from the initial annual income and product series to seasonally adjusted quarterly estimates, with detailed estimates of consumption. Among the uses of the newly developing accounts for wartime analysis were calculations by the War Production Board to determine the impact of President Roosevelt's announced munitions build-up on the overall economy and an analysis by the Treasury Department of the "inflationary gap" implied by the excess of incomes over current consumption and saving. These war-time policy uses were the first ones that relied on the integrated statistical nature of the accounts. Their important role as macroeconomic analytical tools was underscored by the fact that Simon Kuznets of the United States was awarded the Nobel Prize in 1971 when his work in developing the first official set of U.S. national income estimates was cited.

At the same time that the accounts were expanding and finding increasing uses among policymakers, the Bureau was developing the conceptual structure to support the expanded accounts. In July 1947, the Office of Business Economics (OBE), BEA's direct predecessor, published a six-account version of the national income and product accounts (NIPA's).

Table II.1.--BEA Actions in Response to Major Post-War Economic Issues

Development	Major Issue	BEA Actions	Introduced
1940's: War and post-war planning needs	Need for greater detail and frequency of estimates	Addition of quarterly estimates	1943, 1944
		Expansion of detail; detailed consumption estimates	1943, 1944
		Introduction of 6-account NIPA's	1947
		Expansion of detail and frequency for constant-dollar, regional, and international estimates	1950's
Late 1950's - Early 1960's: Sluggish growth, higher unemployment	Needed determinants of economic growth; role of fiscal policy; disaggregated measures for better information on industries and regions	Real GNP by Industry	October 1962
		1958 I-O table	1964
		Business fixed capital stock	November 1962
		Regional I-O projections	1967
Late-1960's - 1970's: Accelerating inflation rates	Accounts needed to portray real changes in economy	GNP fixed-weighted and chain-weighted price indexes	March 1969
		Improved deflation of Federal defense purchases	December 1980

By the mid-1950's, the basic structure of the NIPA's was in place, and the accounts were being widely used for public policy purposes. The NIPA's had expanded to 52 tables, 41 with annual estimates and 11 with quarterly and monthly estimates. Annual constant-dollar estimates had by then become a regular feature.

OBE also supplemented the annual balance of payments accounts with quarterly estimates, including a geographical breakdown to provide data needed to implement the Marshall Plan for rebuilding the war-torn areas of Europe and Asia. On the regional front, OBE continued to provide annual estimates of State income payments, a precursor of State personal income.

Despite several mild recessions, the decade following the end of World War II could be characterized as one of relatively steady advance. The major economic policy concerns were managing the post war conversion of the economy without inflation and subsequently managing the expansion associated with the Korean War and the subsequent adjustment. These were tasks for which the accounts were well-suited, and this period allowed OBE to continue making progress on several fronts--refining the conceptual framework of the accounts, providing additional detail on the national economy, and expanding the scope of the regional and international accounts. A major advance during this period was the introduction in 1958 of quarterly constant-dollar measures of GNP.

Late 1950's and early 1960's

A large part of the expansion in BEA's work and in the content of its accounts during the 1960's can be traced to concerns in the early part of the decade about the pace of growth in the national economy and about unacceptably high levels of unemployment. Increased attention was focused not only on the determinants of national economic growth, but also on the role of fiscal policy in promoting growth. Interest was also focusing on more disaggregated measures of economic activity that could shed light on specific industries or regions in the economy.

BEA launched several major initiatives, including the development of capital stock measures, improved measures of corporate profits, and continuation of input-output work previously housed at the Bureau of Labor Statistics (BLS). In the late 1960's, historically high and rising rates of inflation led to the introduction of improved measures of price change in the form of fixed-weighted and chain-weighted price indexes.

Several of the important new projects undertaken by BEA in the early 1960's were designed to promote better understanding of the role of various "component parts" of the economy and were in support of the Interagency Project on Economic Growth and Employment Opportunities. The purpose of this task force--which included representatives from OBE, BLS, the Office of Management and Budget, and the Council of Economic Advisers--was to investigate ways to raise the economy's growth rate and increase employment. One of the first projects undertaken by BEA in support of the task force was a disaggregation of constant-dollar GNP by industry of origin.

While industrial distributions of current-dollar GNP had been available for some time, the constant-dollar estimates provided the first look at the contribution of different industries to real GNP and how the relative importance of industries changed over time and in response to changing economic conditions. These estimates were first published in 1962 (they were updated annually until 1989, when they were suspended until 1991 to introduce methodological improvements).

On a related front, in 1964 BEA published the detailed input-output (I-O) table of the U.S economy for 1958. I-O accounts describe the interactions of detailed industries, and their development served a growing policy interest in managing the economy through a better understanding of its structural relationships. I-O tables and analysis were pioneered by Wassily Leontief of the United States, and ultimately earned him a Nobel Prize. While development of I-O tables by BEA had been a specific recommendation of the National Accounts Review Committee, it also fit well with BEA's other work during this period designed to provide more disaggregated views of the workings of the economy. The I-O table was statistically and conceptually integrated with the NIPA's; thus it could serve as a benchmark for future GNP revisions.

On a regional level, interest was growing in local area economies and how these economies could be developed independently of events at the national level. BEA began work on its regional economic and demographic projections models in the late 1960's, largely in response to the requirements of the Water Resources Planning Act of 1965. Shortly afterwards, BEA started work on its first regional I-O modelling system. Quarterly estimates of State personal income and annual estimates of personal income at the sub-State level were published for the first time in the mid-1960's.

Another major project undertaken by BEA during this period in support of the interagency growth and employment project was the measurement and analysis of the fixed capital stock and its characteristics. Estimates of business fixed investment and business fixed capital stock were introduced in November 1962, and by 1966 had become a regular feature of BEA's accounts. This work was subsequently expanded to include residential capital, consumer durables, and government-owned fixed capital.

A related concern of the time was the effect of accelerated depreciation and other tax incentives on BEA's estimates of depreciation and corporate profits. BEA responded with studies in 1963 of the effects of the new Federal tax depreciation guidelines and the investment tax credit on corporate profits and on the relationship between depreciation and corporate profits. While measures of fixed capital consumption had been part of the NIPA's since their inception, they were largely based on tax-return data. This work provided the foundation for BEA's estimates of "economic depreciation," which were introduced in 1976.

The historically high and accelerating rates of inflation in the late 1960's raised concerns about how well the accounts portrayed real changes in the economy. BEA responded by introducing fixed-weighted and chain-weighted price indexes for total GNP in March 1969. Previously, only implicit price deflators had been available. The new measures were better indicators of quarterly and annual price changes because they held the composition of output fixed from the prior period. Changes in implicit price deflators, by comparison, reflect changes in the composition of output as well as price change.

By 1976, the new measures of price change were provided quarterly for major components of GNP, including personal consumption expenditures by major type of product, government expenditures by type, and business inventories by industry. Over time, BEA has increased the level of product detail underlying GDP deflation, from 80 products initially to more than 1,000 currently.

Another concern that arose in connection with accelerating inflation rates was the accuracy of BEA's measures of constant-dollar Federal government defense purchases. Until the late 1970's, these estimates were based on private-sector proxy prices, with little supporting product detail. In the mid-1970's, BEA entered into a joint research project with the Department of Defense to develop improved measures of constant-dollar Federal defense purchases. The project was completed in the late 1970's, and BEA introduced the resulting improved measures in the December 1980 comprehensive revision. The value of these improved measures of real defense spending produced by BEA soon became evident during the defense build-up of the 1980's.

Late 1970's to the Present

The past two decades of U.S. economic history have witnessed rapid and seemingly continuous change. While change has been a feature of the U.S. economy throughout BEA's efforts at measuring it, a number of important events during the last two decades have posed major challenges for BEA's accounts during a period of increased resource constraint.

Starting in the early 1970's, some of the major events and developments include the internationalization of the U.S. economy; the collapse of the Bretton Woods system of fixed exchange rates; the two energy shocks of the 1970's; double-digit rates of inflation and long-term interest in the late 1970's and early 1980's; historically large Federal budget and foreign trade deficits during the 1980's; the surge in manufactured exports and manufacturing productivity in the mid-1980's; large foreign investment in the United States; corporate restructuring and downsizing; major tax reform; a stock market boom, crash, and subsequent recovery; financial market deregulation and innovation; concern over rates of saving and capital formation; deregulation of transportation and communications industries; restructuring of production and labor markets; acceleration of the long-term shift from production of goods to production of services; and the penetration of computer-based equipment and other new technology into the U.S. production process.

BEA's accounts have responded in various ways to these developments and others, either because the accounts were designed to anticipate and capture the kinds of changes described above, or because BEA has taken specific actions to change the accounts to accommodate a new trend or development. In illustrating how changes in the economy have affected BEA's accounts during the past 20 years, three broad themes that are a common backdrop to many of these developments--changes in the nature, composition, structure, and organization of economic activity; changes in the nature and importance of investment and capital; and increases in the degree of internationalization of the U.S. economy--are addressed.

Changes in the nature, composition, structure, and organization of the economy

One of the most striking features of the economy in the last two decades has been the change in the very nature of economic output toward intangible and difficult-to-measure dimensions. At the same time, technology, downsizing and restructuring, and shifts in demand have dramatically changed the composition of output and the production, delivery, and consumption of output.

Changes in the nature of output.--Measuring output involves measuring both increases in quantity and quality. The most serious problem in measuring output in our rapidly evolving economy is in estimating improvements in quality. When the Nation primarily produced things such as steel and wheat, output was easier to count--tons of steel goods and bushels of wheat. Today, a larger share of output is produced in sectors where increases in output are often in the form of improved quality and convenience: Consider the impact of 24-hour automatic teller machines and of desktop and laptop computers. Measurement problems are most severe in rapidly growing industries such as telecommunications and services.

In the telecommunications industry, increased competition and advances in technology have produced sharp reductions in the prices of many types of communications equipment, yet the price index for communications equipment has continued to rise, and as a result BEA's real output series may be understated. Part of the problem may be the result of the difficulties in developing price indexes for products such as fax machines, digital switching equipment, fiber optic cable, and modems during a period when the pricing structure and characteristics of these products are changing rapidly.

It is especially hard to measure output in the service-producing sector, where there has been rapid innovation, frequent changes in pricing, and difficulties in accurately measuring and defining units of output. Industries such as finance, insurance, and real estate--which are among the fastest growing in the economy as measured by sales, employment, and current-dollar GDP--are below average in terms of measured real GDP growth. And despite rapid innovation, based in part on revolutionary advances in computation and communications, productivity in these sectors, as measured by real gross product per hour worked, did not increase in the 1980's. The slow growth in real GDP for finance, insurance, and real estate relative to its current-dollar GDP is the result of problems in measuring and defining real output for these industries.

In addition to these problems in high-tech goods and services, there are also serious problems in measuring the output of the construction industries. Here too, increases in output increasingly have been in the form of increased energy efficiency, extra bathrooms, skylights, and other amenities. As a result, during the 1980's an increasing number of questions were raised about the accuracy of measures of real output and prices for structures in the accounts.

Chart II.1 illustrates the importance of these measurement problems. The share of output in difficult-to-measure sectors--services, high-tech products, and structures--has been rising throughout the post-World War II period but seems to have accelerated beginning in the later half of the 1970's. Services as a share of gross domestic purchases have risen from 37 percent in 1959 to 54 percent in 1993, with most of the growth occurring in the 1980's and early 1990's. "High-tech" goods--which are proxied here by video and audio equipment, computers, and musical instruments in consumer spending, aerospace and computers in exports and imports, and information and processing and related equipment and aerospace products in investment spending--and structures significantly enlarge the share of the economy with potentially difficult-to-measure output. Even this partial list of services and high-tech products suggests that the share of difficult-to-measure sectors may be as high as two-thirds of gross domestic purchases.

In response to problems with conventional price and real output measures, BEA has had success in developing hedonic indexes, which measure the characteristics rather than the quantities of a good.[1] (See Table II.2 for a catalog of developments in the accounts in the last two decades.) BEA's work on hedonic measures gained momentum at the time of the dramatic decline in prices, and the concomitant surge in production, of computers and other information processing equipment during the 1980's. These developments were driven largely by changes in technology--both from the supply side in the production of computers and from the demand side in new uses of computers by businesses and households. Constructing indexes of price change for such products is challenging because of extremely high rates of quality change and the introduction of new products, both of which present some of the most difficult problems encountered in price index construction.

In the absence of readily available and reliable data on price changes for computer products, BEA had long assumed that price changes reflected changes in quality and held the price index constant. This assumption seemed reasonable as long as prices were increasing, but analysts raised concerns that BEA's accounts were understating the real output of the computer manufacturing industry and real business investment in new computing equipment when computer prices began to decline. Such an understatement could have

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[1] Although BEA relies on BLS for its source data on price indexes used in estimating real GDP, BEA has developed additional price indexes when the existing price indexes seriously distort measures of real output. The most prominent example is computers. BEA initially developed an index in partnership with IBM that was based on available source data, and BLS later developed an expanded version based on new survey data it collected. BEA now uses the refined BLS computer price indexes to construct its price index.

Table II.2.--BEA Actions in Response to Major Economic Developments of the Past Two Decades

Development	Major Issue	BEA Action	Introduced
Internationalization: Trade in Services	Understated service transactions; as trade increased, became more serious	New surveys of 30 international services	1989
		Improved foreign travel survey	1989
	Gap in financial services; one of the fastest growing international services	Benchmark survey of financial services	Oct. 1994
Internationalization: International Investment Position	Valuation at historical cost; product understated and inconsistent estimate	Revaluation of direct investment and market values for U.S. gold reserves	1991
Internationalization: International Capital Transactions	Gap in coverage; accounts did not capture new channels for financing and new financial instruments	Expanded use of partner-country data	June 1994
		Support of Treasury surveys of portfolio investment	1993; 1994 budget submission
Internationalization: Other International Improvements	Need for more complete monthly data; incomplete picture of trade	Monthly estimates of international services	April 1994
	Lack of establishment detail; needed more detailed analysis of specific industries	Linkage of BEA database of foreign-owned companies with Census database of U.S. establishments	1992

Table II.2.--BEA Actions in Response to Major Economic Developments of the Past Two Decades

Development	Major Issue	BEA Action	Introduced
	Increased interest in the role of multinational firms; more detail needed on ownership	Development of proposed supplemental balance of payments accounting frameworks	1993
	Other	Improved end-use classifications and deflation for trade	July 1988
Structural Change: Constant Dollar GPO	Constant dollar measures were not capturing changes; needed better picture of change such as growth of services, imports, and the role of information processing equipment	Revised gross product by industry series	April 1991
Structural Change: I-O Accounts	Incomplete picture of industries; needed expanded and more timely detail on industry interaction	Improved benchmark input-output accounts	April 1994
	Incomplete picture of industries; needed frequent information on changing industry structure	Annual input-output tables	1987

Table II.2.--BEA Actions in Response to Major Economic Developments of the Past Two Decades

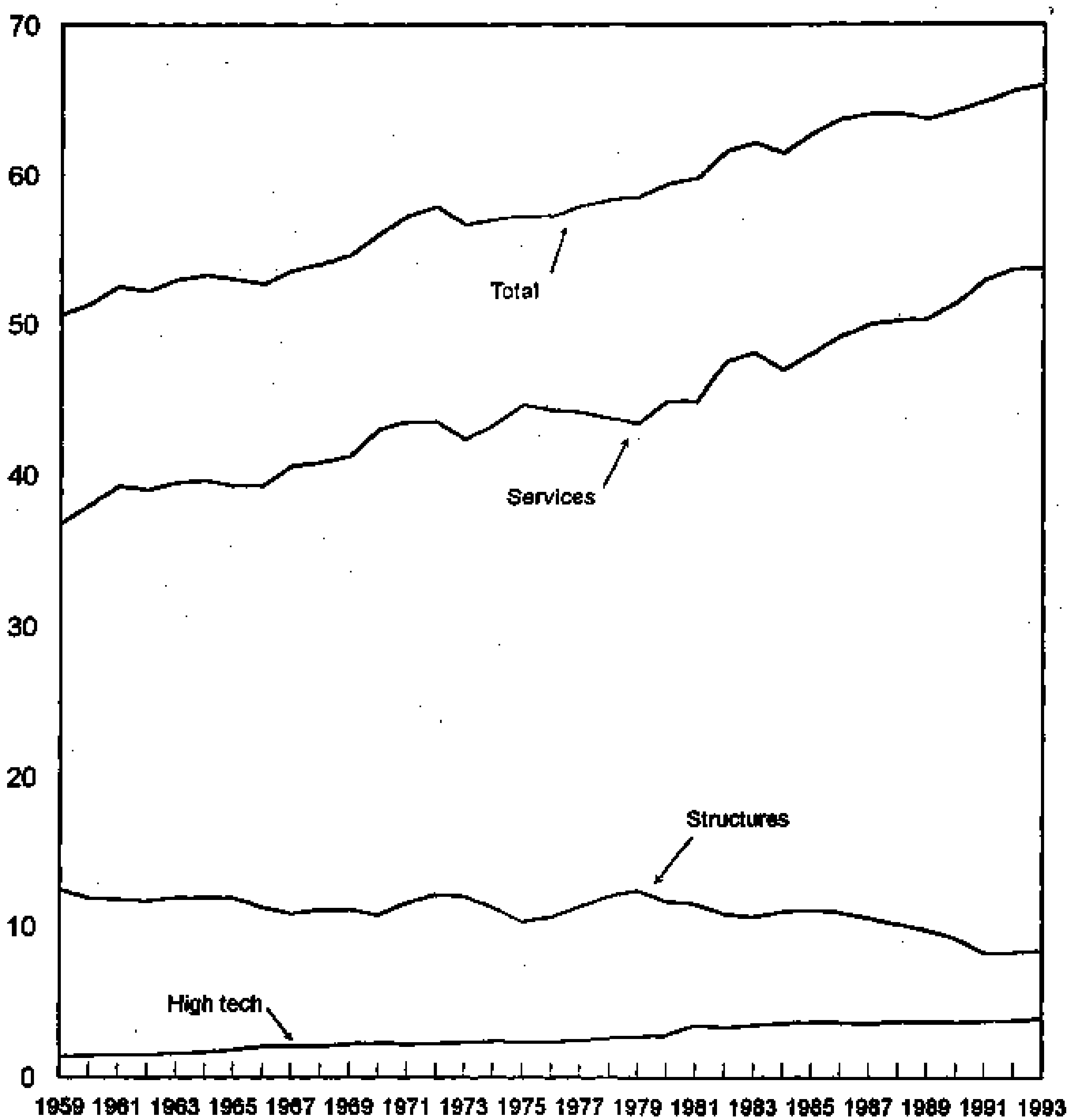
Development	Major Issue	BEA Action	Introduced
Structural Change: Gross State Product	Incomplete picture of regional activity; regional analysts needed detail on the contribution of each State to GDP to understand changes in economy's regional structure	Gross state product by industry	1988
Other Structural Change	Changing nature of deposit insurance; need to reflect the increased general fund exposure of federal deposit insurance due to savings and loan crisis	New classification of federal deposit insurance	1991
	Changing nature of health care; need to reflect more widespread availability of benefits and greater choice of health care	Reclassification of Medicaid outlays; this conformed its treatment with Medicare	Dec. 1985
	Incomplete picture of capital consumption; need to reflect capital consumption for abandoned nuclear power plants	Adjustment to recognize capital consumption for abandoned nuclear power plants	Dec. 1991
Prices: Improved price indexes and deflation procedures	Substitution bias of fixed weighted index	Alternative measures of real GDP change that reflect changing relative prices	April 1992

Table II.2.--BEA Actions in Response to Major Economic Developments of the Past Two Decades

Development	Major Issue	BEA Action	Introduced
	Changing relative prices; dramatic price decline and production surge in computers	Computer price change measures based on hedonic techniques	December 1985
	Heterogeneity in structures; tracking average price of narrow definition not practical	New price index for deflation of multi-family structures based on hedonic techniques	December 1991
	Improved import prices	Introduction of BLS import price indexes for deflation of imported producers' equipment	July 88
	Improved government prices	Improved deflation of federal government defense purchases	December 1980
Other Developments	Increased concerned about the impact of economic growth on the use of natural resources and environmental quality	Environmental and Economic Accounting	April 1994
	Growth of the underground economy	Improved adjustments for the underground economy	June 1984

Chart II.1.--Share of Hard-to-Measure Output in Gross Domestic Product, 1959 - 1993

[Percent]



serious implications for the measurement of growth and productivity change.

In light of these concerns, BEA had begun work toward a computer price index when IBM Corporation offered to participate in a joint research project to determine the most appropriate methods for measuring changes in computer prices and for estimating the real output of computers. As a result of this collaboration, new price measures for computers were introduced in the revised GDP estimates that were released in December 1985. The new price measures were constructed by BEA primarily from price indexes for computing equipment developed by IBM. An important feature of BEA's new computer price index was the use of hedonic methods to control for quality change. Hedonic methods control for changes in quality by accounting for the impact of changes in observable price-determining characteristics.

BEA's improved estimates of computer purchases in constant dollars affected each major GDP expenditure category because of the widespread use of computers, but its largest impact was clearly in producers' durable equipment (PDE), which is the largest category of business fixed investment. Introduction of the new price measures in the December 1985 benchmark revision significantly raised the growth rate of real spending for computers and peripheral equipment. BEA's improved price measures raised the average annual growth rate nearly sixfold--from 10 percent to nearly 60 percent per year, as the new rapidly declining price index for computers boosted real expenditures[2].

In addition to the improvements in computer prices, BEA also developed an hedonic-based index for multi-family residential structures; however, these improvements in computers and construction have not yet been matched by parallel improvements in price measures for goods and services also characterized by rapid changes in price, quality, or other features that render measurement difficult. Among the candidates for improved output and price measures are medical equipment, aircraft, telecommunications equipment, high-tech manufacturing equipment, single family residential structures, nonresidential structures, and a wide range of services.

Service output may be even more difficult to measure than high-tech and other goods because, in some cases, it is difficult to even specify what the service, or bundle of services, is. For example, once banks and a few other kinds of financial intermediaries took deposits and made loans, and earned a "profit" on the margin between the interest rates. Now banks and a much wider array of institutions do that, but also much more. The question today is: How can that bundle of services be specified and measured? Without answers to these conceptual questions, empirical work on hedonic indexes cannot begin.

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[2] It is interesting to note, however, that the rebasing of fixed-weighted price index for computers (to 1982 = 100) partly offset the effect of the new price index (because the price index weight used in calculating real output for computers was significantly lower in 1982 than in 1972). A revision in nominal spending on computers also offset the introduction of the price index so that the net increase in real growth was from about 10 percent to about 40 percent.

New international guidelines in national accounting, such as the System of National Accounts (SNA), begin to provide answers to these questions, but it is clear that this area is on the frontier of economic accounting and additional research will be required before a satisfactory solution to defining and measuring services output will be provided.

<u>Changes in the composition of output</u>.--Rapid change in the composition of output (and prices) has worsened pre-existing difficulties with various measures in the accounts. For example, within the index number literature, it has been long recognized that fixed-weighted output measures tend to overstate current period growth as one moves further from the base period and the base year price weights become increasingly outdated and inadequate for depicting current economic activity. Use of fixed-weighted indexes also pose problems of comparability for business-cycle, or other long-term, analyses because of the significant shifts in real output and prices over long periods of time. Just as use of current weights, such as 1987 price weights, overstate growth in more recent years, these weights understate growth for earlier years.

This bias in fixed-weighted measures arises because fixed-weighted measures do not reflect substitution by consumers and producers in response to changing relative prices. This "substitution bias" reflects the fact that the commodities for which output grows rapidly tend to be those that register the smallest increases in prices. Thus, when real GDP is recalculated using more recent prices, the commodities with strong output growth receive less weight, and growth in the aggregate measure is reduced.

Use of the same (fixed) price weights over all time periods provides a set of estimates that can be expressed in constant dollars and that are additive. Many users consider the additive property of real GDP and its components to be useful, and this is one reason BEA has used fixed-weighted measures in the past and continues to feature such measures. The additive property facilitates analysis of contributions to growth and changes in shares of economic activity.

Until the 1980's, the bias associated with fixed-weighted measures and the associated differences in growth rates due to base year shifts were small enough to be safely ignored. The simplicity of a single output measure outweighed any advantage provided by alternative measures or by more complex weighting approaches. Two developments contributed to a different view of this trade-off and to the need to investigate alternatives. First, beginning in the 1970's, changes in the prices and quantities of the energy and food components of GDP were large enough in certain periods for the choice of price weights to affect the measurement of change in real GDP. Second, the rapid decline in the price of computers--about 15 percent per year from 1982 to 1988--contributed to lower real GDP growth when rebased its real GDP estimates. Using 1987 price weights real GDP growth from 1977-90 was about 0.2 percent lower per year than with 1982 price weights. In addition, a sharp reduction in world oil prices after 1985 contributed to relative price instability.

If relative prices change significantly, as happened more frequently in the 1970's and 1980's, then measures that use relative prices from different points in time as weights are more appropriate for both current period and long-term real GDP comparisons. They also avoid the potentially significant revisions in real GDP growth rates that occur when base years are moved forward in benchmark revisions conducted approximately every 5 years. Recognizing the important effect of shifting relative prices on real GDP growth rates, BEA initiated a research program to investigate alternative measures. In April 1992, BEA published alternative measures of annual change in real GDP for the period 1959-90. Alternative measures of quarterly change in real GDP were first released in March 1993, and are now a regular feature of quarterly NIPA releases.

The two alternative measures of change in real GDP that were introduced in 1992 are not based on the price weights of a single base year. Rather, they are indexes that account for changes in relative prices over the periods for which growth rates are computed. In the chain-type annual-weighted quantity index, the weights are from adjacent years. In the benchmark-years-weighted quantity index, the weights are from adjacent benchmark years--about 5-year intervals. BEA has also extended alternative measures to its estimates of gross product by industry. These estimates allow more accurate analysis of changes over time in the contribution of various industries to total GDP.

The fixed weighted-measure, however, has remained the featured measure of real GDP for at least two reasons. First, users of the NIPA's have a substantial investment in the fixed-weighted measure in terms of knowledge and experience. Second, the differences between the featured and alternative measures may not be large enough to affect many types of analysis. Consistent use of one measure may very well lead to the same analytical results as consistent use of another measure. The simplicity of the fixed-weighted measure relative to the alternative measures would then become an important factor.

Further work in this area will involve examination of other alternative measures and methods that attempt to combine the advantages of fixed-weighted measures with the more up-to-date weights embodied in the alternative measures. These methods include chain-linking of up-to-date fixed-weighted measures, chain-linking of superlative indexes, proportional allocation of the residual real output that results from summing real GDP components derived from superlative indexes, and inclusion of the residual in an unallocated category.

In addition to the effect of changes in the composition of output on real output and price measures, there has been an important effect on industrial classification systems. The present industrial classification system--the one on which BEA's GDP and gross state product by industry estimates, its input-output accounts, and its foreign direct investment and services data are based--presents an outdated and poorly organized picture of economic activity. Despite an expansion of services detail in the 1982 and 1987 revisions of the classification, there is still far less detail for services, which account for 54 percent of GDP, than for manufacturing, which accounts for 18 percent of GDP.

Work toward a new classification was begun as a cross-agency U.S. effort in 1992 under the auspices of the Office of Management and Budget and now being carried forward jointly with our NAFTA partners. The new system will replace the existing system in 1997.

Changes in the structure and organization of the economy.--The rapid pace of change in the U.S. economy has not only changed the composition of output, but changed the way that output is produced, distributed, and consumed. Companies have reorganized and downsized by reducing labor input, reorganizing production lines, utilizing new technologies and foreign suppliers, increasing their use of bonuses, increasingly relying on foreign financing and ownership, and distributing their output through new outlets. Consumers have also changed as increasing labor force participation rates have put a premium on time. Consumers have responded by changing their purchasing patterns and valuing increases in convenience, dependability, and quality over increases in quantity.

These changes have affected BEA's accounts in a number of ways. The most obvious example was the suspension of publication of BEA's series on GDP by industry, known as gross product originating (GPO), from 1989 to 1991. The suspension followed criticisms that the methodology for constant-dollar measures was not adequately capturing important changes in the economy, such as the growth of services, the growth of imports, and the role of computers and other information processing equipment. In response to these criticisms, BEA undertook a major overhaul of the methodology, and in 1991 published revised series covering the period 1977-89.

The acceleration of change in the structure of the economy also increased preexisting concerns regarding the ability of BEA's I-O accounts to meet the needs of analysts and policymakers for timely information on how industries interact--providing input to, and taking output from, each other--to produce GDP. BEA has responded to these concerns by developing improved methods that exploit alternative source data and working with Census to expedite the receipt of detailed quinquennial Census information.

BEA has also attempted to adjust for changes in the structure of the economy in its annual and benchmark revisions by developing new techniques to better capture personal purchases of rapidly growing services such as child care, video cassette rentals, light truck rentals, and financial services such as commissions on mutual fund purchases. Adjustments have been made to capture changing product distribution channels that resulted in sharp growth in purchases of food and beverages at gasoline service stations and other retail outlets. Other adjustments have been made to reflect the abandonment of existing plants during the downsizing and restructuring of the 1980's.

Change in the structure of the economy has also affected the location of production, distribution, and consumption of output. During the 1980's and 1990's, the pattern of growth varied significantly across the regions of the United States, with rapid growth on the two coasts of the United States during the 1980's expansion and much slower growth in the rest of the country.[3] In

[3] During the expansion in the 1990's, it appears the West Coast, especially California, is now lagging behind the rest of the country in economic growth.

1988, BEA introduced estimates of gross state product (GSP) by industry. GSP is the contribution of each State to the nation's GDP. This measure, which had long been requested by regional economic analysts in order to understand better changes in the regional structure of the U.S. economy, is based on BEA's national estimates of gross product by industry.

Other changes in the structure of the economy.--Over time, attention has turned to the increasing importance of various forces and sectors that had heretofore not been adequately dealt with in the economic accounts. These included natural resources and the environment, the role of government--especially government enterprises--and the role of nonprofit organizations.

In the environmental area, by the mid-1970's, policymakers and the public had become increasingly concerned about the impact of economic growth on the use of natural resources and on the quality of the environment. New environmental legislation had led to significant levels of spending for pollution abatement and control. In 1974, BEA published, for the first time, estimates of capital expenditures by business for air and water pollution abatement. The following year, the estimates were expanded to cover all sectors of the economy and all types of pollution abatement and control spending. Constant-dollar estimates were introduced in 1979. An important feature of these estimates is their integration both statistically and conceptually with the NIPA's, allowing them to be used to determine the share of the Nation's resources devoted to pollution control and abatement.

Last this year, BEA took another major step forward in its work on measuring the impact of the economy on the environment with the release of a framework for, and initial estimates of, the value of mineral resources as an economic asset, and the costs associated with depleting them. Failure in the past to account for mineral resources as a form of capital in a manner symmetric with the treatment of other assets has been blamed both for less than optimal exploitation of such resources and for incomplete analysis and policy decisions relating to productivity and budgeting.

These estimates were part of the first phase of a multi-phase project to develop integrated economic and environmental satellite accounts, a supplementary set of accounts structured to show the interactions of the economy and the environment more fully than the existing economic accounts. BEA began work in this area as part of a long-term program to modernize its economic accounts to more closely reflect the principles and recommendations of the international SNA. Satellite accounts organize information in an internally consistent way that suits the particular analytical task at hand, yet they maintain links to the existing accounts.

Like the environment, government has long been recognized as having an important impact on the economy, but in recent years there has been renewed attention to accounting for the activities of government, especially where the line between government and private activities is a bit blurred. Governments --Federal, State and local, and the enterprises (such as hospitals and tollroad authorities) associated with them--play an important but changing role in the economy. They produce goods and services, they tax and make income transfers, they build bridges and put other infrastructure in place, and they own a significant share of the Nation's wealth. BEA plans to better highlight that changing role of government as part of its movement toward the SNA. The SNA includes an expanded accounting for government activities by type of activity that helps to analyze and identify the role of government in the economy and their interaction with other sectors. In general, this is accomplished by accounting for government in a manner more symmetric with business.

Another area where restructuring is required is in nonprofit institutions and households, where a clearer separation and accounting is needed. The category that is usually called "consumer spending" makes up two-thirds of GDP, such a large share that the factors that influence it are often critical in determining the course of the economy. Yet about 10 percent of the category is not spending by consumers, but the expenses of nonprofit institutions. These range from the Ford Foundation and Harvard University to local charities, and they are subject to different influences and react differently than the households that are usually thought of as consumers. BEA hopes to improve the accounting for these sectors when it moves to the SNA, which provides for clear and separate accounting for these sectors.

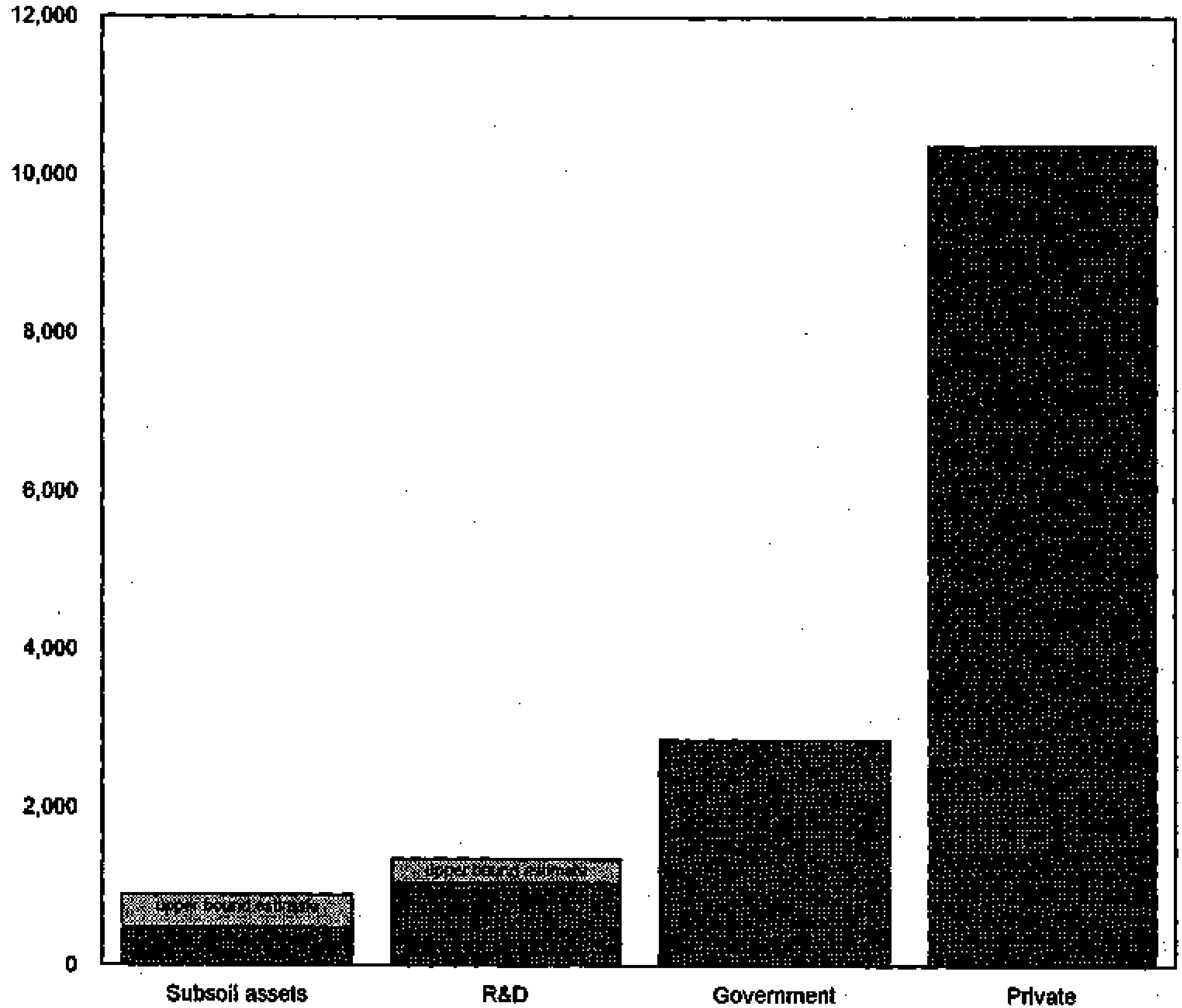
Changes in the nature and importance of investment

Scope and measurement of investment.--In recent years, increased attention has been placed on the importance of investment and capital, and assessing how the Nation's wealth may be affected by changes in public policies. Capital in the traditional economic accounts is limited to structures and equipment, but a broader view of the Nation's wealth would include natural resources and intangible assets such as computer software, research and development, and even more broadly, training and education. The direct role of government spending in capital formation is also an issue because the rate of economic growth may depend partly on public infrastructure. The rapid pace of technological change and changes in relative prices also raise concerns about the measurement of the Nation's stock of capital. Still another important issue of future concern is the impact of the aging and retirement of the "baby boom" generation on health care resources.

A broader definition of investment may be quite helpful in understanding the sources of economic growth and the returns to, and adequacy of, various types of public and private investments. Chart II.2 illustrates the relative importance of the capital stocks associated with various types of expenditures currently omitted from the definition of investment in the national accounts. Addition of mineral resources would add between $480 and $910 billion, or 5 to 9 percent to the stock of fixed capital, research and development capital between $1050 and $1380 billion, or 10-13 percent, and government capital,

Chart II.2.--Fixed Capital, 1991

[Billion $]



$2863 billion, or 28 percent. As part of its move to the SNA, BEA hopes to address a number of these issues, including treatment of government expenditures on structures and durable equipment as capital, and has begun to address some of these issues through the construction of satellite accounts. The SNA addresses these issues through an expanded definition of investment and within a series of "satellite" accounts that can focus on issues ranging from research and development and natural resources to health care and pensions.

An improved measure of capital stocks and depreciation would also help improve the quality of analysis of investment and capital. Although BEA's introduction of replacement cost capital stocks based on straight-line depreciation using assumed service lives was a significant improvement over the existing historical cost estimates based on tax data in the mid 1970's, increasing rates of technological obsolescence and rapid changes in prices have raised a new round of concerns regarding BEA estimates. As part of the modernization of its accounts and its move toward the SNA, BEA hopes to move closer to actual market values in the valuation of depreciation and capital stocks, by using available data and methods based on declines in used asset prices and other data.

Integrated income and wealth accounts.--Just as there has been an increased recognition of the importance of international capital flows for trade flows, the events of the 1980's and 1990's, such as the stock market crash in October of 1987, have emphasized the importance of changes in financial holdings for consumer and business spending. BEA hopes to continue work with the Federal Reserve Board, which prepares the flow of funds accounts and balance sheets, to develop the more fully integrated framework for accounting for and analyzing the financial and real sectors of the economy set forth in the SNA.[4]

Improved measures of existing concepts of investment.--Investment, especially inventory investment, has always been one of the most pivotal components of GDP in business cycles. Business investment and changes in inventory behavior, such as just-in-time inventory delivery systems, have also figured prominently in analyses of the economy. Yet despite this interest, serious problems remain in the source data, with substantial gaps in the coverage of components of residential and nonresidential investment and especially in inventories.

Internationalization

In the early post-war period, foreign trade was not a major factor affecting the U.S. economy. Large merchandise trade imbalances were rare, net

[4] BEA and the Federal Reserve Board staff co-authored a paper that provided current and capital accounts and balance sheets for the government sector. See Elizabeth Fogler, Stacey Panigay, Timothy Dobbs, and John Pitzer, "The 1993 SNA and the Modernized Government Sector Accounts for the United States," paper presented at the 23rd General Conference of the International Association in Income and Wealth, August 1994.

exports represented a small share of total GDP, and exports, except in a few industries, were not an important source of demand for domestic production and employment. Similarly, foreign capital markets and the flow of foreign investment in the United States had only a limited effect on U.S. financial markets and U.S. monetary policy. The United States was a large net lender of capital to the rest of the world.

However, much of that changed during the 1980's. A flood of merchandise imports hit the United States; services became a more important part of U.S. exports; foreign investment in the United States surged; and both imports and exports of goods soared in the late 1980's. The import share of domestic consumption and foreign investors' share of financing for U.S. investment were both less than 5 percent in the late 1950's; by the early 1990's, the import share had more than doubled to above 10 percent and the investment share rose to more than 25 percent (chart II.3). Although the United States had never been immune from economic shocks originating in the foreign sector, this succession of developments during the 1980's hastened the integration of the U.S. economy with those of other nations in the evolving global economy.

Indeed, these developments have inspired a fundamental reassessment of economic thinking on the links between foreign trade and financial flows. In the past, financial flows were viewed largely as accommodating transactions that moved in response to trade flows, but events of the 1980's put a new perspective on this relationship.

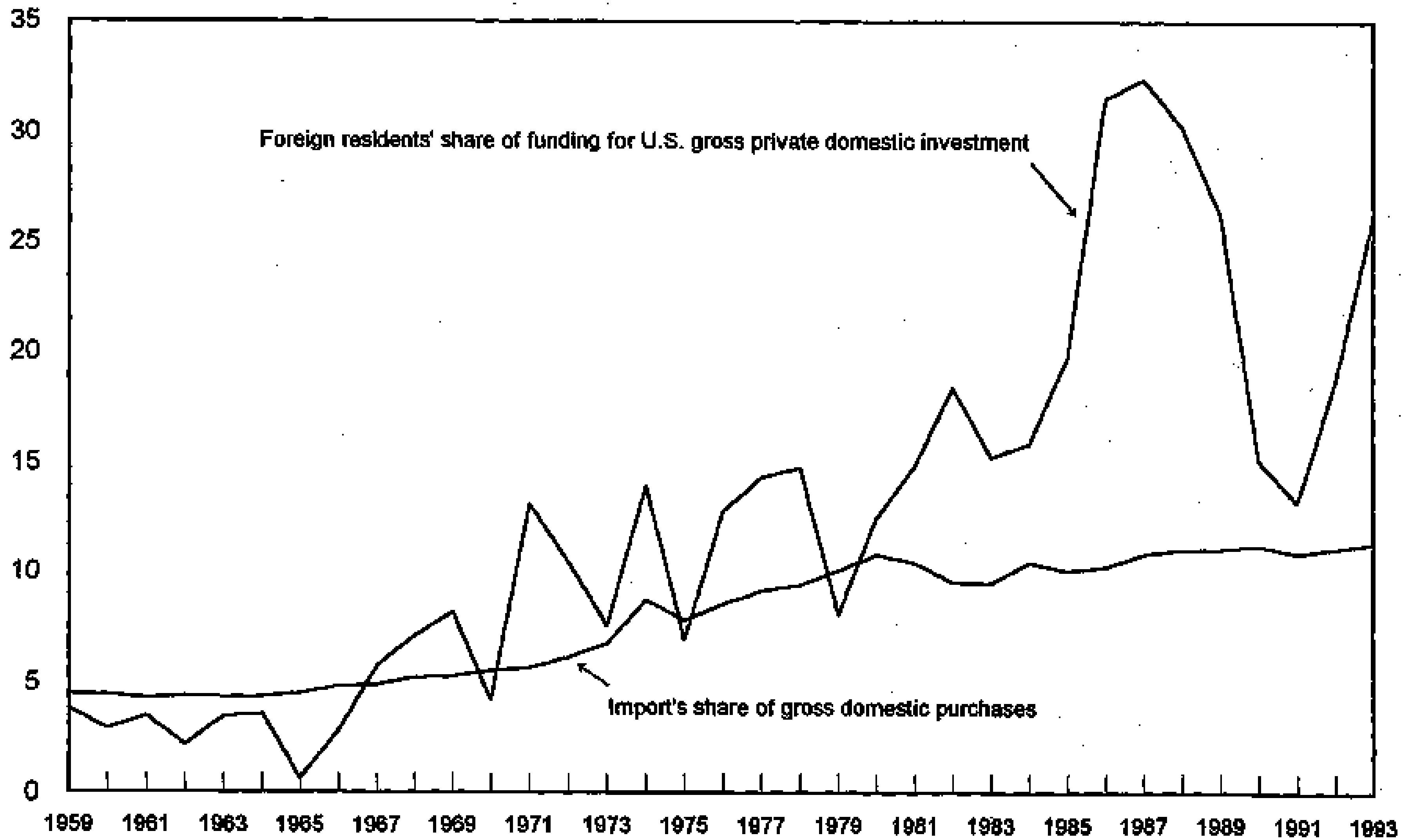
The surge of foreign capital into the United States in the 1980's--partly in response to the high real U.S. interest rates associated with large Federal budget deficits and tight monetary policy and their effect on trade flows--led to talk of the "twin deficits" and an increased recognition of the importance of financial flows in influencing trade flows. This interest in foreign capital flows was reinforced by the recognition that U.S. interest rates were increasingly influenced not just by monetary policymakers in Washington and New York, but also by policymakers and investors in Tokyo and in Frankfurt.

To capture these effects of globalization, BEA significantly expanded the scope of its international data collection program; introduced major changes in the measurement and valuation of international investment; and launched a multi-year improvement program designed to close the gaps in its coverage of international services. These actions have significantly improved BEA's international accounts both for analysis of the U.S. role in the global economy and for trade policy purposes. However, much work remains, as many of the improvements were designed to correct specific problems rather than to address more general issues. Hence, while the improvements closed many of the existing gaps in coverage, they failed to address emerging gaps associated with new financial instruments and trade in services.

International trade in services.--During the 1980's, it was widely believed that BEA's measures of international services transactions understated both exports and imports of services, particularly business

Chart II.3.--Indicators of the Internationalization of the U.S. Economy, 1959 - 1993

[Percent]



services such as telecommunications and computer and information services. Prior to this period, the volume and surplus on services was small. However, with an acceleration of the long-term shift from goods to services in the United States, and with increasing demand for services from abroad by foreign residents, some observers suggested that the U.S. balance of payments surplus in services had been understated, and the current account deficit overstated. The growth in services trade also prompted demands from trade negotiators and the business community for more comprehensive, detailed, and timely measures of trade in services relative to those for goods.

Since the mid-1980's BEA has significantly expanded its measures of services by adding 30 international services transactions not previously covered and working with the U.S. Travel and Tourism Administration and Foreign Governments to develop improved foreign travel estimates. In response to an increased emphasis on timely measures of services by economic analysts and policymakers, BEA developed monthly estimates of services that, along with the existing merchandise estimates provides a more complete picture of U.S. international trade on a monthly basis.

Despite these improvements in services, significant gaps remain. One of the largest is in the measurement of financial services transactions, which have become one of the fastest growing services in international trade. BEA has designed and soon plans to conduct a new benchmark survey of transactions in financial services between U.S. and unaffiliated foreign persons. Other improvements that BEA hopes to make in the area of international services include modifications of existing surveys of foreign direct investment in the United States and U.S. direct investment abroad to collect more data on affiliated services; increased data exchanges for services with other countries; and introduction of new source data to improve the quarterly estimates of some of the larger and more volatile components of services.

Capital flows and investment.--During the 1980's, major advances in computer and communications technology, combined with deregulation in financial services industries, sparked dynamic changes in global financial markets. These changes both opened new channels for financing economic activities and inspired the introduction of new types of financial instruments. These developments, in turn, led to gaps in BEA's coverage of international transactions, particularly international flows of portfolio capital. Inaccurate portfolio capital measures also had implications for the reliability of the current account because the capital positions are used in estimating income flows.

To meet this need, starting early in this decade, BEA launched a multi-year, multi-front effort to improve its portfolio capital measures. For example, greatly expanded use of data from partner countries in the June 1994 revision of the U.S. international transactions accounts, covering the period 1984-93, added nearly $100 billion in capital outflows and nearly $116 billion in capital inflows that were previously not recorded. The capital accounts now reflect economic developments during these years much more completely than before.

BEA has also supported expansion in the coverage of the Treasury Department's surveys of portfolio investment to capture direct transactions between U.S. pension and mutual funds and foreign residents. These transactions previously had bypassed the existing survey system, which is based on data provided by U.S. financial intermediaries. Treasury is also currently conducting a benchmark survey of U.S. portfolio investment abroad for BEA, the first in more than 50 years.

Although BEA has made effective use of counterparty data in filling gaps in coverage, increased use of counterparty data to capture direct transactions in securities and other financial transactions will require further work in establishing common definitions and common data collection systems. In addition to the need for further work on data exchanges, work is required on measures of new financial instruments such as derivatives.

One of the largest and most rapidly increasing gaps in the coverage of international capital flows is due to new financial instruments. For example, derivative instruments have grown particularly rapidly in recent years, but consistent data on U.S. transactions in derivatives, or the market value of U.S. exposure to foreign risk through derivative instruments, are not available. According to data collected by the Bank for International Settlements from its reporting banks alone, the notional principal value on interest rate swaps grew from $1.5 trillion in 1989 to $3.9 trillion in 1992; the value of currency swaps grew from $0.9 trillion in 1989 to $1.7 trillion in 1992. There are no consistent estimates available on the market value of these contingent claims.

The other major development that occurred in the 1980's that affected the international accounts was the rapid rise in foreign investment. When it peaked in 1987, net foreign capital inflows accounted for about one-third of the funds used to finance gross private domestic investment (Chart II.3). For decades, the United States was an undisputed "net creditor" nation, but by the late 1980's was increasingly described as the "world's largest debtor nation." This designation and the rising volume of foreign direct investment in U.S. companies became subjects of increased public concern and debate.

However, some knowledgeable observers wondered if the designation of the United States as the "world's largest debtor nation" was not just a measurement problem. Although most of the assets in the U.S. international investment position (such as portfolio investment and most reserve assets) were being valued at current-period prices, other assets (specifically, direct investment and gold) were being valued at their historical purchase cost. Because a very large share of U.S. direct investment overseas was made before 1980 and a very large share of foreign direct investment in the United States was made after 1980 at higher prices, the historical-cost measures significantly understated the net direct investment position of the United States. In 1990, BEA temporarily suspended publication of the net international investment position and developed two new alternative measures--current-cost and market-value--to revalue its estimates of direct investment in prices of the current period.

During this period BEA also significantly expanded its coverage of foreign direct investment through expanded surveys as well as through data exchanges (which allowed significantly more detailed analysis of the specific industries in which U.S. affiliates of foreign companies operate, with no increase in respondent burden). In recognition of the increasing importance of the world-wide sales of multinational companies, BEA also developed what may be called satellite accounts for the U.S. balance of payments that are based on an ownership, rather than a residence, basis.

Summary

During the 1980's and 1990's, the economic accounts have adapted to changes in the economy and policy concerns. BEA has pioneered in the development of new price indexes that address biases that arise due to rapid changes in the quality and composition of output. BEA has also led other countries in improving measures of international trade in services and international investment, and in the development of satellite accounts. However, the list of incomplete or unaddressed issues remains large. Among the more important areas where the accounts continue to lag are the following:

- *Improved output and price measures: BEA's work with IBM in developing a hedonic price index for valuing computers was a critical first step, but the list of services, high-tech goods, and other products for which current measures may be inadequate or biased is large and growing. Measurement errors in output and price indexes for important products such as telecommunications equipment may result in a significant understatement of real--that is, inflation adjusted--measures of the strength of investment spending and the rate of productivity growth. The rapid pace of change in the economy also has raised significant problems for fixed-weighted output indexes, and BEA's experimental work with alternative price indexes needs to be extended.*

- *Structure of the accounts: The structure of the U.S. accounts needs to be updated. A modernized set of accounts based on the SNA will provide an integrated picture of the effect of financial holdings and transactions on consumer spending, investment, trade and other components of GDP. Such accounts will present a more comprehensive picture of the varied and changing role of government. As other nations move to update their accounts in line with the new SNA, it will be increasingly important that the U.S. accounts be updated, both for domestic policy and for coordinating macroeconomic policy in today's integrated world economy.*

- *Industrial classification: The present industrial classification system--the one on which BEA's GDP and gross state product by industry estimates, its input-output accounts, and its foreign direct investment and services data are based--presents an outdated and poorly organized picture of economic activity. Implementation of the new North American Industry Classification System should be an important priority for the U.S. statistical system.*

- *Satellite accounts: BEA has made important strides in its development of a Research and Development Satellite Account and Integrated Economic and Environmental Satellite Accounts (IEESA's). Extension of this work will significantly extend the usefulness of the economic accounts.*

- *Extended and improved measures of investment and capital:* *The agenda calls for extension of the concept of investment to include government expenditures of structures and durable equipment, computer software and other intangibles, improvement of existing measures of depreciation and capital stock, and improved source data for fixed and inventory investment.*

- *International trade and capital flows:* *Significant improvements in the coverage of international trade and capital flows notwithstanding, there is a large and growing agenda in measuring the service sector. In some areas, such as international trade in financial services and derivative financial instruments, there are gaps in coverage; in others, such as computer software, there are problems in both defining and measuring the output.*

MID-DECADE STRATEGIC REVIEW

OF BEA'S

ECONOMIC ACCOUNTS

Background Papers

Paper III: Recommendations from Outside Experts

Bureau of Economic Analysis
Economics and Statistics Administration
United States Department of Commerce

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III. Recommendations from Outside Experts

Overview

This paper summarizes recommendations that emerge from reviews of the economic accounts during the last two decades by working groups, professional organizations, trade associations, and other outside experts. These reviews include both wide-ranging reviews and more subject-specific reviews. The sample reveals some of the characteristics of users of the accounts and their concerns.

- *Recommendations from public users typically result from official reviews of an entire agency or the statistical system itself, may cover the entire range of estimates within the economic accounts, and reflect the Government's effort to monitor its own successes and failures. Private users, on the other hand, tend to concentrate on areas of specific interest to them.*

- *Recommendations have a "living" nature; as the economy and the accounts change, new concerns arise and recommendations are made so that the accounts are always evolving. Further, users are persistent in their efforts to influence economic accounting. Concerns, especially when widely felt, are repeated if left unaddressed and thus may offer an indication of the areas deemed most significant by users. For instance, this paper illustrates that the adequacy of services estimates has been addressed by many groups over the last two decades. Similarly, government purchases, particularly the coverage of State and local government purchases, has been a concern for many years.*

- *In many respects, the concerns of BEA's customers reflect the same broad themes of changes in the nature of output and the way the economy is organized to produce it, changes in the nature of investment, and the internationalization of the economy that BEA itself has grappled with in its ongoing attempts to maintain the accuracy, reliability, and relevance of the accounts. In other respects, these recommendations are more narrowly focused on the day-to-day uses of the accounts in managing the economy and private decision-making.*

The external recommendations summarized in this paper in many ways reflect the changes in the economy discussed in paper II. However, because most external reviewers are data users, their recommendations also tend to reflect their particular interests and concerns.

- *Business cycle analysts may focus on revisions in GDP that reflect problems in making early estimates of key components of GDP, such as inventories.*

- *Service industry and trade specialists may focus on gaps in the coverage of international trade in services.*

- *Monetary authorities may focus on biases in price indices and their effect on estimates of the long-term rate of real GDP growth.*

- *Productivity analysts may focus on problems in investment and capital stock estimates.*

- *International organizations may focus on gaps in the coverage of international capital flows between world financial centers.*

The Role of External Recommendations

Because BEA's national, international, and regional accounts have evolved into indispensable tools for economic analysis and forecasting, the accounts' users scrutinize them quite closely. These users--who include public policymakers, the news media, private analysts, research organizations, and academic economists--have a wide range of interests in the accounts, and are often in an excellent position to suggest improvements. BEA welcomes and encourages these suggestions and has consistently made strong efforts to respond to their recommendations when resources allowed.

This paper summarizes a sample of the recommendations that emerge from external reviews of the economic accounts during the last two decades. These reviews are grouped into wide-ranging reviews and subject-specific reviews, and to the extent possible, the recommendations within each group are discussed in chronological order, although this order may be interrupted to allow sequential discussion of follow-up reviews.

An annotated list of over 500 recommendations arising from these reviews and others are included in a database that has been constructed by BEA. A summary of these recommendations and BEA's progress in implementing them is presented at the end of this paper.

Wide-Ranging Reviews

GNP Data Improvement Project Report 1977

One of the most significant reviews of the Federal statistical system was the GNP Data Improvement Project. Two substantial revisions of quarterly GNP in a 6-month period (July 1971 and January 1972) raised major concerns among policymakers about the national income and product accounts (NIPA's) and about the quality and timeliness of the underlying source data. In response to these concerns, the Office of Management and Budget (OMB), in its role as coordinator of the Federal statistical system, established the Advisory Committee on GNP Data Improvement to conduct a comprehensive study of the content, accuracy, and timeliness of the underlying data used in constructing the economic accounts. The study focused on data needs for the quarterly GNP estimates, the annual revisions, the quinquennial benchmark input-output (I-O) tables, and constant-dollar GNP estimates.

In 1977, the Advisory Committee released a landmark report that recommended more than 150 specific improvements and assigned priorities for their implementation from 1978 through 1983. Priorities were based on the dollar size of the transaction addressed; the impact of the recommendation on the quarterly and annual movements of the data item; and the feasibility of implementing the recommendation. The Advisory Committee stated in the report that the budget was not a factor in determining priorities because the cost information available to the Committee was limited.

Some of the recommendations of the Advisory Committee were directed primarily at BEA, but as many or more were directed at BEA's data suppliers, including the Bureau of Labor Statistics (BLS) and the Census Bureau. High-priority recommendations for BEA focused on the need for improved documentation, the use of alternative or newly available source data, and changes in the schedule of data releases. High-priority recommendations for data suppliers included the need for expanded and improved data on services, construction, State and local government purchases, fixed investment, inventories, and foreign trade.

General Accounting Office 1982

Following up on the GNP Advisory Committee's report, the GAO in 1982 issued a report to Congress entitled, "BEA Should Lead Efforts to Improve GNP Estimates." This report reviewed quarterly GNP revisions for the period 1968-80 in response to a Congressional request to reevaluate the relative importance of the Advisory Committee's recommendations and reassess the reliability of the GNP estimates.

Despite using different criteria, this study concluded with concerns similar to those of the Advisory Committee. The study focused on those Advisory Committee recommendations involving GNP components with the largest contributions to revisions; the need for improved source data; and the impact of budget reductions. The study found that four major components, while only a small portion of the level of GNP, contributed significantly to GNP revisions: Change in nonfarm business inventories; net exports; farm proprietors' income; and corporate profits. In addition, lack of quarterly detail for State and local government purchases and purchases of certain services had resulted in uncertain estimates for these relatively large components.

The study did not address the slowdown of developmental work or the damage to GNP estimates caused by budget cutbacks, but noted that budget constraints were threatening the integrity and reliability of the basic GNP database: BEA's reliance on data collected by other agencies left the estimates vulnerable to any program changes or budget reductions occurring at the source agencies. In fact, the report found that budget cuts were responsible for reductions in the database for three of the four components with large contributions to revisions, and for one of the components without quarterly source data detail. One example was the reduction of Census Bureau economic censuses and programs in fiscal year 1982; specifically, the 1982 commodity transportation survey, used by BEA for I-O tables and GNP benchmark estimates, was deferred to a later year. Consequently, the study approved of BEA's high-priority focus on maintenance and restoration of the source data.

GAO also concluded that the Advisory Committee should have considered budget constraints in setting priorities and that OMB's Office of Information and Regulatory Affairs was not effective in insuring that the most important recommendations would be implemented. Further, GAO suggested that priorities be placed on those recommendations that would most reduce GNP revisions, and it recommended to Congress that BEA assume a leadership role in implementing the improvements.

Economic Policy Council 1986

In addition to providing continuing oversight of Federal agencies, individual administrations may conduct their own evaluations of agency performance. In one such case, the Economic Policy Council of President Reagan in 1986 established a working group to review the quality of economic statistics, develop recommendations for improvements, and identify priorities for implementation. The Working Group on the Quality of Economic Statistics was Chaired by Robert Ortner, Under Secretary for Economic Affairs at the Department of Commerce, and Wendy Gramm, Administrator for Information and Regulatory Affairs at OMB.

The Working Group reported in 1987 that, while the economic statistics produced by the Federal Government were basically sound, improvements were needed. The Working Group was particularly concerned with the accuracy of GNP estimates, especially given the size and variability of revisions and possible biases in the estimates of investment, productivity, and other real growth contributors; the adequacy of merchandise trade estimates, due at least partially to "carryover" problems and, according to the 1982 GAO report, also due to seasonal adjustment problems; and the adequacy of service sector estimates, due to limited coverage and the difficulties of measuring service prices and qualities.[1]

The Working Group also included two recommendations for BEA of a more general nature. The first was increased involvement of users in the improvement of GNP statistics through the organization of "review groups consisting of government and nongovernment experts with particular expertise in the series to be evaluated." The second was prompt and up-to-date publication of methodology and changes in methodology.

Economic Statistics Initiative 1989

A working group on economic statistics was established in 1989 during President Bush's administration. Chaired by Michael Boskin, Chairman of the

[1] "Carryover" refers to the problem of reporting exports and imports in a month other than the one of actual exit or entry.

Council of Economic Advisers (CEA) at that time, this Working Group was formed to address serious problems confronting the U.S. statistical system resulting from the rapid pace of change in the economy. These problems were attributed to the increasing importance of the service sector, the growing globalization of the economy, the deregulation of industries, and the increasing rate of technological innovation.

The Working Group initially developed a package of 25 recommendations of the highest priority for improving economic statistics in 1990; a second set was issued a year later. Known as the Economics Statistics Initiative (ESI), these recommendations for both short-term and long-term improvements focused on proposals that addressed well-known measurement errors, that were in areas important to public policy, that were cost-effective, and that could be completed in a reasonable period of time. It also set priorities to resolve the conflicts between accuracy and timeliness and emphasized the need for increased resources.

The recommendations of the Working Group included a number relevant to BEA's work on national and international economic accounts; these included the following areas:

- o Measures of productivity, output, and prices: These recommendations addressed needed improvements in output, or real GDP; improvements to domestic and international service estimates; improvements to construction estimates; and the separation of quality and inflation changes in price data used to produce real GDP.

- o Measures of investment, saving, and wealth: These recommendations focused on updating and improving the concepts and methods used by BEA in measuring and valuing investment, saving, and wealth--especially the definition of investment, the consistent valuation of wealth at market values, and the coverage of international capital flows.

- o Measures of employment, income, and poverty: Most of the recommendations in this area were directed at BLS and Census Bureau.

- o Other national and international economic accounts measures: Other recommendations focused on (1) modernizing and extending the accounts by moving to the revised System of National Accounts and the IMF's revised Balance of Payments Manual; (2) improving the existing national accounts by speeding up the I-O tables, improving measures of "high-tech" prices, State and local purchases, consumer spending, construction, and financial services; and (3) improving the international accounts by improving measures of new financial instruments and services.

Other recommendations were directly targeted at other agencies but would have resulted--through improvements in source data--in significantly improving and modernizing BEA's accounts. These included recommendations for improved tracking of change across industries, sharing of statistical data, and improved price data. Particularly important was the recommendation on the sharing of establishment data and its potential for both eliminating unnecessary duplication and for improving the source data for the national accounts.

General Accounting Office 1994

GAO is currently investigating the progress made to date on the ESI. Its organizational scheme, which allows the 1990 and 1991 sets of recommendations to be discussed in an integrated fashion, classifies recommendations into seven categories: (1) NIPA recommendations, which focus on improvements in the existing accounts (including "high-tech" prices, consumer spending, State and local government purchases, construction estimates, and GDP by industry estimates), I-O table improvements, and the movement towards the SNA; (2) service sector recommendations, which include the expansion of basic data collection, improved estimates of purchased services, and improved estimates of service prices; (3) improved price measurement, particularly of services, and the separation of price changes into quality and inflation changes; (4) labor market recommendations, directed to the BLS; (5) poverty and income recommendations, directed to the Bureau of the Census; (6) international transactions recommendations, particularly to improve estimates of trade in services, international investment and capital flows, and imports and exports; and (7) system-wide recommendations, including increased data sharing and coordination among statistical agencies.

GAO found that there were 38 separate recommendations in the 1990 and 1991 recommendations of the ESI. GAO found that during the period 1990 to 1994, BEA had made many improvements that did not originate under the ESI. Further, several methodological innovations using existing data bases had been implemented to address the issues raised by the ESI. (Limited funding provided to agencies often causes them to focus on improvements which can be implemented quickly and cheaply.) These methodological improvements helped address the most urgent gaps in coverage, but failed to provide the statistical infrastructure required to address emerging problems on an ongoing basis.

Office of Technology Assessment 1989

At about the same time that the ESI was being formulated, the Congressional Office of Technology Assessment (OTA) in 1989 was preparing a report entitled "Statistical Needs for a Changing U.S. Economy" that addressed data improvements needed for policy analysis. The report evaluated the effectiveness of the statistical system to monitor growth; to identify the causes of growth (or lack thereof); and to produce important estimates for analytical use.

The report determined that the existing statistical system, by providing little information about new developments in the economy, particularly about new technologies, made it difficult to track growth and change. The report further determined that agencies' attempts to address problems were hampered by the absence of effective coordination and management, and suggested that

OMB viewed its oversight and coordination role too narrowly. The report did not offer recommendations for specific statistical improvements, but instead suggested that improved management and coordination of statistical agencies could lead to statistical improvements.

Specifically, the report stressed the need for (1) an organization to reexamine priorities in light of new user needs and to coordinate the work of Federal statistical agencies; (2) an evaluation of whether statistical efforts match the significance of the problems; (3) improved management; (4) a formal mechanism to ensure that user needs are reflected in priorities; (5) modern computational and communication equipment; (6) international cooperative efforts; (7) decreased reporting burden; and (7) integration of statistics to illustrate the effects of changes on households. The report maintained that these recommendations, if implemented, would help to address deficiencies in several areas, including, among others, the measurement and evaluation of real growth, especially in areas affected by quality change and in services; estimates of purchased services and inputs; the movements of imported products through the U.S. economy; and the construction industry.

IMF Report on the World Current Account Discrepancy 1987

International organizations may monitor the statistics submitted by member nations and respond to user concerns about international data. For instance, in 1984, the International Monetary Fund (IMF) established a Working Party to investigate and recommend procedures to improve statistical practices in response to concern that the world current account had begun, in 1979, to show a large negative discrepancy. Such a discrepancy indicates that either the deficits of some countries were being overstated, or that surpluses were being understated (some observers suggested that perhaps the world was running a surplus against the moon). The Report on the World Current Account Discrepancy cited problems in the estimates of investment income, which showed the most persistently rising discrepancy. In fact, one significant source of the discrepancy was BEA's inclusion in the balance of payments income data of unrealized exchange gains or losses resulting from the conversion of financial assets and liabilities into the currency of another country. Along with recommendations to many nations, the Working Party recommended that BEA exclude such gains or losses from balance of payments data. The report also cited problems in the estimates of services, particularly of transportation, which showed a large but fairly stable discrepancy over time, and in the estimates of unrequited transfers, of which official unrequited transfers showed a large negative discrepancy and private transfers showed a smaller positive discrepancy.

IMF Report on the Measurement of International Capital Flows 1989

A second example of international reviews is the IMF's response to concern about international capital flow estimates. In the 1980's, the volume and complexity of international financial transactions was increasing at the same time that the quality of relevant data was deteriorating. In 1989, the IMF conducted a study of the measurement of international capital flows; it found that world capital account statistical systems were "in a state of crisis" and had difficulty keeping up with the rapid developments in international financial markets, making it difficult to find information adequate for analysis.

The recommendations included in the Report on the Measurement of International Capital Flows focused on the need for the compilers of balance of payments statistics to comply with the IMF's Balance of Payments Manual, the need to review statistical systems periodically and promote quick adaptation to changes, and the need for additional resources to be devoted to balance of payments statistics. One particular problem relevant to the United States was the less than comprehensive coverage of portfolio investment: The absence of benchmarks, limited coverage of direct transactions not intermediated by domestic financial institutions, and gaps in the coverage of new financial instruments all contributed to the problem. The report recommended use of common definitions by adhering to the revised Balance of Payments Manual, coordinated benchmarks, and data exchanges to improve coverage.

The report noted that ten industrialized countries accounted for 85 percent of the total reported capital flows; thus much of the responsibility for improvement rests with them, and, in turn, with the United States, as one of the largest industrialized economies. The report also, however, acknowledged several improvements BEA was already implementing as part of the ESI, including the development of estimates for late survey respondents and nonrespondents, the expansion of the sample frame for portfolio investment to increase coverage of direct portfolio transactions by pension and mutual funds, and increased use of counterparty data.

National Academy of Sciences 1992

Statistical agencies may request private reviews. These studies provide the statistical agencies with a review by a panel of nongovernment experts able to provide a fresh perspective on difficult issues. In 1990, in response to concerns regarding the adequacy of U.S. international statistics, those U.S. agencies responsible for these statistics--Census, Customs, BEA, Treasury, and the Federal Reserve Board--asked the National Academy of Sciences (NAS) to review their adequacy for measuring an increasingly integrated world economy. The NAS Panel on Foreign Trade Statistics in 1992 reported the findings of that study in Behind the Numbers: U.S. Trade in the World Economy.

The primary recommendations directed at BEA were to supplement the balance of payments data with data on an ownership basis; to provide more and better estimates of services, including constant-dollar estimates; and to improve estimates of capital flows.

In addition to these specific recommendations, the NAS panel also made a number of general suggestions. One of the most important in the area of balance of payments capital flows was the establishment of an advisory body that would provide an ongoing and organized means of communication between data users and data producers on issues ranging from the development of concepts and frameworks to setting priorities for data collection. Other recommendations focused on conceptual developments, the user cost of data, and the importance of documentation. Finally, the report fully supported the requests for additional funds included in the ESI.

American Economic Association 1988

In 1988 the American Economic Association appointed a committee to assess the quality of economic statistics. The Committee on the Quality of Economic Statistics, in its report The State of U.S. Economic Statistics: Current and Prospective Quality, Policy Needs, and Resources, focused on the gaps and weaknesses in statistics and identified several determinants of quality in statistics, including the amount of resources devoted to measurement, the organizational structure in place to define priorities, and the extent of understanding on the part of statistical policymakers of the economic processes taking place.

The most significant problems identified in the report included insufficient information about the growing service sector, which complicates the measurement of output; a lack of information on productivity--including its rate of change and its relationships to labor, capital, government intervention, and other factors--particularly in service industries; outdated and inadequate estimates of international trade and financial flows--including understated export figures and large gaps in the coverage of services and capital flows; and a lack of quality information on savings patterns.

The Committee also emphasized the contradiction between the resources devoted to the statistical system and its importance to scientific, commercial, and public policy analyses. According to the report, resource constraints have forced statistical agencies to maintain quality in some areas by diverting resources from other areas, decreasing the ability of the statistical system to provide data and, consequently, decreasing the quality of economic forecasts, analyses, and policy formulation. Moreover, the report predicted that the problems would intensify during the 1990's as the changes in the economy continued.

The Committee concluded that improvements would require increased resources for the agencies, a strong body responsible solely for coordination and statistical policy, and an active statistical research and development program among the agencies. Further, it urged, as one of the most important factors of improvement, that users be more involved in design of statistical programs.

National Association of Business Economists 1988

The National Association of Business Economists (NABE) formed a committee in 1985 to evaluate the current state of Federal statistics, develop suggestions for improving their quality, and provide comments on the suggestions of the Economic Policy Council's Working Group on the Quality of Economic Statistics. (That report was discussed above and shall not be discussed here, except to note that the NABE Statistics Committee supported the Working Group's recommendations, noting that their implementation would require additional funding.)

In general, the findings of the NABE Statistics Committee were similar to those of the American Economic Association's Committee, emphasizing the need for increased funding, improved response rates, improved international statistics, more research, and a revised SIC system. The Committee reported that the failure of the government to devote sufficient resources to economic statistics hampered their usefulness for policy development or analysis. Specifically, the report examined the budgets of the Census Bureau, BLS, BEA and the Internal Revenue Service. It estimated that real spending for the programs that generate the most widely used major economic indicators had decreased from 1976 to 1988 in all of the agencies except BLS.

The Committee recognized that some improvements had already been made, such as the reduction of the carryover problem in international trade data, and that additional funds had been provided in some areas. Nevertheless, the report noted that the international trade data remained inadequate--the lack of price change information and of seasonal adjustment for the monthly figures still complicated interpretation--and that other program funds had been reduced or eliminated. The Committee agreed with the increasingly common concern that resource constraints had at least partially contributed to the difficulty faced by the statistical programs in keeping up with the changes in the economy.

The consequences of the static or decreasing program resources were separated into methodological and content problems. Methodological problems included the decline in the response rate to some surveys, the deterioration in the accuracy and timeliness of foreign trade data, decreasing amounts of research into existing and emerging issues, and the infrequent reassessments of the computer price index, leading and lagging indexes, and the poverty standard. Content problems included the outdated SIC and the lack of information for analyses of industrial competitiveness.

The Committee offered several suggestions for improving economic statistics. First, it urged the OMB to provide leadership to the statistical agencies, Congress to provide funds and outline deficiencies as they are revealed in hearings, and the agencies themselves to formulate proposals for improvements. Second, it asserted that the National Science Foundation should establish a program for funding research on basic economic indicators and that the agencies should establish internal research units. Finally, it noted that the most difficult objective would be changing the negative perception of government surveys. As a start, the Statistics Committee felt the Joint Economic Committee should hold hearings to publicize the importance of accurate information and that the media should be encouraged to inform the public of the need for accurate information. The Committee also urged NABE itself to disseminate this report widely to emphasize the importance of improving statistics. Additionally, the Committee recommended its establishment as a standing committee, so that it and NABE members could work with the statistical agencies to find ways to improve the statistics.

Eisner 1989

Robert Eisner's 1988 address as president of the American Economic Association considered several instances where the measurements of the NIPA's diverge from economic theory. First, he described the divergence of the income measures in the accounts from the most agreed upon definition of income. For example, following the Hicksian definition, where income is that which can be consumed while maintaining real wealth intact, it can be argued that only real--that is, inflation adjusted--capital gains and losses be included in income. In the accounts, however, interest income is not so adjusted. Other divergences that affect income include the failure to count the consumption of durable goods, net of depreciation, in income; the inclusion of housekeeping activity when performed by a paid employee but not by an unpaid household member; the exclusion of transportation expenses in income when paid by the employer but not when paid by the employee; and the failure to consider any government activity as intermediate product.

Eisner considered the divergences between theory and measurement even more significant in the areas of saving and investment. Following the standard definition of investment--the acquisition or production of capital which contributes to current and future output--Eisner considered the production of new automobiles, research and development expenses, and education and similar government expenditures to be investment; in the NIPA's, they are considered consumption or government expenditures. Saving, as equal to investment, should include the portion of income used to invest in human capital. With respect to measures of the government surplus or deficit, he asserts that a major adjustment is necessary to exclude capital expenditures, less depreciation charges, from government spending and include them as investment. Further, in keeping with his recommendation that only real, not nominal, interest receipts should be included in personal income, he suggests that not all of government nominal interest payments should be counted in outlays, but should be adjusted for the changing real value of government debt. According to Eisner, these two adjustments to government savings estimates would virtually eliminate the currently perceived government deficit.

Finally, Eisner cited the failure of direct investment estimates to value investment at current, rather than original cost (see Eisner and Pieper, below).

Duncan and Gross 1993

In 1993, Joseph Duncan and Andrew Gross examined the Federal statistical system from a forward-looking perspective, and they found that many changes were required if the statistical system is to be effective in the 21st century. In Statistics for the 21st Century, Duncan and Gross examine many of the problems facing statistical agencies today, including many already discussed in the context of other reviews.

One major--and perhaps understated--point made by Duncan and Gross was that changes in source data necessarily take a long time. The development of time series of consistent estimates requires consistent definitions, concepts, and classifications over time; on the other hand, economic developments motivating change may be short-lived. Further, stability in the statistical system avoids revision of concepts to suit political objectives. Once these tradeoffs have been resolved, there are other obstacles to implementing change. As Duncan and Gross explain, once the research into proper concepts, data collection methods, etc., has been completed, the budgeting process itself sets the pace for implementation. Indeed, they assert that even under the best circumstances, "there is at least a five-year gap between identifying a need for statistical programming innovation and useful output."

In a section on recommendations specifically for the national accounts, Duncan and Gross address, as one of three broad areas, the infrastructure for economic statistics. They urge that BEA convene a broadly based standing group of users of the national accounts with whom it consults on a regular basis. The subjects for consultation would include conceptual innovations, technical issues, data presentation, or other aspects of the accounts.

Subject-Specific Reviews

Conference on Research in Income and Wealth on capital 1976

More typically, private organizations focus on specific areas. In 1976, at about the same time that the Advisory Committee was examining the full range of GNP input data, another group was focusing on the measurement of capital. After BEA incorporated measures of real capital consumption into the benchmark revisions of the NIPA's, the Conference on Research in Income and Wealth held a conference on the measurement of capital. The papers presented at that conference, all of which related to the problem of how to measure capital in real terms, were published in the 1980 volume of Studies in Income and Wealth of the Conference on Research in Income and Wealth.

One paper, by Allan Young and John Musgrave, discussed the perpetual inventory method (PIM) used by BEA to measure real capital, that is, the constant-dollar capital stock. The other papers discussed the problems with this method. There were three primary criticisms. Briefly, with the PIM the actual goods that comprise the stock are not directly (physically) counted. An error in measuring the new investment goods of the price index used to deflate them will, consequently, affect the measure of the value of those goods over their entire economic lives. The result is that, though the PIM always provides a time series of real capital, there is no internal check to indicate measurement errors. Such errors could be serious because of the relatively rapid change in the quality of new investment goods, which may not be adequately reflected in price indexes. Second, the straight-line depreciation method used by BEA, which assumes that depreciation is the same in each year of a good's life, may not accurately measure economic depreciation, that is, the change in the market value of capital goods due to their aging. Jack Faucett offered conceptual reasons why depreciation charges could rise as a good ages. Charles Hulten and Frank Wykoff analyzed prices of new and used structures to conclude that depreciation on them rapidly declines as they age. Robert Coen showed how economic depreciation could be estimated from an equation linking investment to output, productive capacity, and other variables. Third, the price indexes used by BEA measure the size of the capital stock on the basis of the cost of production so that costless improvements are excluded from estimates of the capital stock. Alternative indexes would measure real capital goods on the basis of their performance characteristics. There are theoretical and empirical problems with both methods.

Other economists focused on expanding the boundary of what is included in capital: One treated land, consumer durables, human capital, and research and development as capital; one treated stocks of oil and gas as capital; and one treated real net revaluations as increases in capital. Finally, W.E. Diewert and Murray Brown questioned BEA's use of the Laspeyres quantity index as an indicator of the size of the capital stock and discussed the problem of aggregating different types of capital goods.

Conference on Research in Income and Wealth on selected topics 1979

The Conference on Research in Income and Wealth, 1979, addressed selected aspects of the NIPA's, particularly the issues of deflation, quality change in price indexes, and source data. A paper by Richard Ruggles discussed new developments such as sectoring issues, nonmarket transactions and imputations, and the integration of financial transactions and balance sheets with the national accounts. Finally, he offered an alternative approach to accounting for insurance, pensions, and interest, and he presented household balance sheets.

Many of the papers discussed unresolved deflation issues, especially the problem of accounting for quality changes. Jack Triplett and Robert Gordon discussed the theory and measurement of quality change and the debate over user-value versus resource-cost measurement. John Early and James Sinclair described the approach used by BLS for quality adjustment. Richard Ziemer and Karl Galbraith presented the results of the BEA study of defense purchases, which used direct pricing for the deflation of defense purchases.

Discussion of data problems constituted the rest of the conference. Lawrence Klein, wanting improved analyses of inflation, requested more timely I-O tables with more detailed breakdowns of costs than available from other sources. Otto Eckstein felt that too much time was devoted to concepts and not enough to statistical accuracy; similarly, Alan Greenspan stressed the importance of timely statistics. Edward Denison criticized the latest changes to the Standard Industrial Classification (SIC), raising the point that in considering changes, the government typically gives considerable weight to industry requests, which are based on short-run considerations. Arthur Okun stressed the need for physical volume data for measuring real output, especially given that the data available for deflation--sales and price data--are collected by different agencies.

Office of Technology Assessment on trade in services 1986

Estimates of services have troubled users of both domestic and international data. After a request by the Senate Committee on Governmental Affairs for the OTA to assess international competition in the service industries, and a later request for the OTA to separately publish its estimates of the impacts of services trade on the Nation's balance of payments, the OTA published a special report on "Trade in Services: Exports and Foreign Revenues." The report examined alternative methods of defining and measuring international services trade and estimated the level of U.S. international trade in services from 1982-1984.

The OTA concluded that balance of payments estimates had understated exports and imports of services. The OTA also asserted that improvements in the data on trade and investment in services could be achieved at little additional cost. However, it suggested new and expanded surveys and the use of alternative data sources--both typically high-cost efforts--and, although the report stated that "it should be possible to redesign the [BE-20] survey to provide useful, if more limited data, while reducing the costs for businesses surveyed," it does not offer evidence that such limitations would either provide useful information or substantially lower costs.

Mishel and Denison on industry estimates 1980's

While the IMF and OTA were evaluating international service estimates, others were concerned with estimates of domestic services. The 1986 report of the Economic Policy Council had noted the inadequacy of service statistics; in 1982, GAO had found them to be particularly troublesome. The increasing importance of services relative to manufacturing in the U.S. economy provoked increased criticism in the late 1980's of BEA's constant-dollar estimates of gross product originating (GPO).

Lawrence Mishel asserted that by inaccurately estimating GPO by industries, BEA was seriously overstating the growth rate of the manufacturing sector relative to other industries. Specifically, he discussed problems with BEA's adjustments of industry estimates in certain years to make constant-dollar GPO more consistent with GNP estimated as the sum of expenditures; the price indexes BEA used to deflate manufacturers' purchases of materials, which do not reflect the prices of imports; the price indexes BEA used for services, which rose too rapidly and thus understated the growth of consumption of services and, in turn, overstated the growth of manufacturing; and the lack of data on current-dollar purchases of materials and services, which increased uncertainty about the estimates.

Edward Denison was also concerned with the GPO series because he felt the price index BEA used for computers, which showed rapid price declines, contributed to the rapid growth of the computer industry and, therefore, of manufacturing.

Eisner and Pieper (1990) and Ulan and Dewald (1989) on the investment position

Also in the late 1980's, the perception that the U.S. had become the "world's greatest debtor nation" received increasing attention. Consequently, the measurement of the net international investment position (IIP) came under increasing scrutiny and many asserted that the measurement was inaccurate and misleading. Comments were of two types: First, that this assertion was misguided and was based on the incorrect perception that the U.S. IIP estimate indicates net debt (not further discussed here), and second, that BEA's estimates of the U.S. IIP were inaccurate.

Eisner and Pieper (1990), and Ulan and Dewald (1989) contended that direct investment and foreign direct investment should be measured at current value rather than at historical cost. Briefly stated, the problem was one of inflation: historical-cost estimates of investment greatly understated the current value of U.S. investment in other countries by not accounting for inflation and thus resulted in a less than favorable IIP for the United States. This problem was exacerbated by the fact that U.S. investment in other countries was typically older than foreign direct investment in the United States and was thus presented as much less valuable when inflation was not considered.

Conference on Research in Income and Wealth on selected topics 1988

In May, 1988, the Conference on Research in Income and Wealth celebrated its fiftieth anniversary by holding a conference on economic measurement. The papers presented at that conference and reproduced in Fifty Years of Economic Measurement looked both backward and forward as well as at current issues--both conceptual and pragmatic. Carol Carson's paper commemorated the Conference by recalling its early years and acknowledging its influence on national accounting since its formation in 1936. A number of other authors considered the importance of the national accounts for business and policy analyses, according to their areas of interest, including saving and capital accumulation measures, productivity analysis, tax policy, and the data needs of capital analysis, labor economics, and environmental regulation.

Several papers addressed deflation issues, with hedonic prices indexes as a frequent focus. Charles Hulten discussed the use of hedonic price indexes for the adjustment for quality change in computers and nonresidential structures, but cautioned that problems exist with this method as well, citing that large differences can be achieved by different hedonic methods. He concluded that, despite the ingenuity of BEA, BLS, and Census in improving the measures of capital, real progress depends on the development of new data sources on retirement and depreciation practices and on used asset prices. Zvi Griliches reminded participants that the adjustment for quality change in price measurements had been identified as a problem more than 20 years earlier and recognized both the progress that had been made in hedonic prices work as well as the amount of work still necessary in that field; in particular, he stressed that despite the progress, it is necessary to explain, rather than just measure, productivity growth. He had argued in the past, and again here, that the unexplained residual in productivity studies could be greatly reduced with improved measures of inputs via hedonic index numbers for both capital and labor. Jack Triplett also addressed hedonic methods; after reviewing their history, he discussed possible reasons for the slow response on the part of government statistical agencies to their benefits. Paul Pieper considered the problem of deflation with respect to construction prices. He concluded that, despite progress by BEA and Census Bureau, BEA still largely relies on cost indexes and proxy indexes, rather than hedonic indexes or other methods of estimating price indexes that would address the likely upward bias in BEA's overall deflator for new construction.

Griliches on productivity 1994

Zvi Griliches maintains that the U.S. measurement and observational tools are becoming more and more inadequate in the context of the changing economy. In his presidential address to the AEA in 1994, Griliches concentrated on the need to expand knowledge about the unexplained factors of output and productivity growth. In addition to a general plea for better data, particularly for nonagricultural and nonmanufacturing sectors, Griliches called for better data on investments in research and development. While he praised BEA's new computer price index for the improvements it would make in productivity analysis, he concluded that BEA's failure to improve other important price indexes would simultaneously result in overstated productivity growth in the computer industry relative to other industries. Finally, though he acknowledged both measurement difficulties and budget restraints, he was adamant about the importance of improved data.

Greenspan on data for conduct of monetary policy 1994

The concerns of the Federal Reserve Board focus on measures important to the conduct of monetary policy: The measurement of inflation, output (real GDP), and financial transactions. These concerns were recently highlighted by Alan Greenspan, Chairman of the Federal Reserve Board in testimony before the Commerce, Consumer, and Monetary Affairs Subcommittee of the House Government Operations Committee. He noted that:

- "...the list of shortcomings in U.S. economic data is depressingly long. There are biases in aggregate price indexes, incomplete reporting of international transactions, a significant amount of mere interpolation in the service portion of our national income accounts, uneven coverage of the financial accounts of households and firms, and unreported economic activity."

- "Breakthroughs in computing hardware, software, and communication technologies may allow data collection to be more precise, but these and other innovations make the economy more difficult to measure. This results, in large part, because the output of goods and services is increasingly becoming more conceptual than physical over time."

Although Chairman Greenspan praised BEA's progress in developing alternative price indices, one of his two highest priorities for improvement was additional research on the construction of price indexes; the second was more and better data on derivatives and other new financial innovations.

Coalition of Service Industries on services 1982-present

Trade associations, as part of their mandate to promote and protect the interests of their members, must monitor information, including statistical information, about their members. Thus, it is not surprising that, since its establishment in 1982, one of the goals of the Coalition of Service Industries (CSI) was to "improve the coverage and accuracy of information available on the service economy."

To achieve this goal, CSI has used its monthly newsletter, "The Service Economy," to notify members of relevant studies or articles about service industry statistics; notify members of changes made by statistical agencies to the methodologies or source data used to estimate services; conduct its own statistical analyses to draw attention to needed measures; and support others' suggestions or make its own. A few of the many examples of this support and advocacy follow:

o In the February, 1994 issue, CSI reported that BEA and the Census Bureau would begin, in March 1994, to issue a new monthly report that would provide estimates of U.S. trade in services and would present merchandise trade adjusted to a balance of payments basis. CSI supported this change; the Chairman of the CSI Trade Task Force, Charles Heeter, said, "CSI believes the U.S. government should assign a high priority to expanding and improving services trade data, and this change will go a long way toward correcting misperceptions about the importance of service exports to U.S. trade." Indeed, CSI had long advocated such a change so that merchandise and service estimates would be published together rather than the merchandise trade estimates being published monthly and service trade estimates being published quarterly.

o CSI has encouraged the Federal Government to produce some measure of output in services so that productivity could be more effectively analyzed; it published relevant articles in the July and October 1989 issues and the Executive Director of CSI advocated producing such a measure in the October 1992 issue.

o In the March 1991 issue, CSI urged Congress to approve President Bush's budget proposals for the ESI.

- CSI urged BEA to redefine services to exclude investment income and to create a separate category for income receipts and payment on U.S. assets abroad; in the September 1990 issue, it reported that BEA had done so.

- CSI has advocated the reevaluation of the few SIC categories assigned to services and the establishment of additional categories.

- CSI has advocated the expanded coverage of exports, particularly affiliate sales, in the balance of payments data.

Gramlich (1994) and others on regional accounts

Edward Gramlich, in concluding his review of the literature on the returns to public investments, noted that one of the most important things that can be done in this area is to improve estimates of the stock of government capital, through the provision of disaggregated State and regional estimates and through improved estimates of economic rates of depreciation. In his article, "Infrastructure Investment: A Review Essay," he noted that improved estimates of the infrastructure stock would "improve estimates of the size of this stock and the desirability of expansion."

Gramlich is the most recent of a number of researchers and government officials calling for improvements in the regional accounts. Among the various extensions and improvements called for are the following: constant-dollar estimates of State personal income based on regional price indexes for use in analytical studies as well as for allocation of Federal funds; integrated data on exports and imports by State of origin and use for use in trade promotion and assistance work; integrated data on foreign direct investment by State and industry for use in efforts to attract and analyze foreign investment; and more timely State and local data for use in tax projections by budget officials.

Summary

Recommendations from the studies reviewed in this paper and others are included in a database (to be available as a diskette attached to the final report). The individual recommendations in the database will prove useful for implementation of improvement plans over the next decade, for gauging the interest in, and importance of, various improvements, and for assessing progress in addressing external recommendations for improvement.

One way the database may be useful is by allowing "counts" to be made of recommendations in given categories to reach conclusions about their relative importance. Tables III.1 - III.3 present the resulting counts, which are also summarized in the discussion below.

The disadvantages of this method must be noted. First, the recommendations included in any such database, are, to a degree, arbitrary, and thus the "count" of any given category could be affected by including more *studies. While BEA included over 500 recommendations in its database and tried to include the most significant studies performed, many more could have been included. Second, the classification scheme itself is arbitrary. BEA tried to classify recommendations by the component or components affected, repeating recommendations across categories when appropriate, and following as closely as possible the classification used by the national accounts. However, for different uses, another classification scheme may be useful and could result in different "counts." Finally, the "high" or "low" number of recommendations relating to a specific topic does not necessarily reflect the importance of that topic. For instance, BEA and statisticians in most of the other industrialized countries consider frequent benchmark surveys of holdings to be critical and are working on an IMF- coordinated international benchmark survey. Yet, because interest in this area is relatively recent, this recommendation appears only in one study, and only a few recommendations were even separately identified as affecting the international investment position in the appendix.*

National accounts: The database currently contains almost 400 recommendations classified as suggested improvements in the national accounts. Within the major components of GDP, the largest number of recommendations for improvement are in investment, followed by imports and exports, consumer spending, and government purchases (table III.2). (Other recommendations classified as "national accounts recommendations" included those concerning prices, I-O accounts, and "other.")

- *Among the subcomponents of investment, the largest number of recommendations deal with improvements in inventories, followed by nonresidential fixed investment and residential investment.*
- *Within consumer spending, by far the largest number of recommendations focus on improvements in consumer services.*
- *Among the components of government spending, by far the largest category is State and local purchases.*

Since fundamental improvements are dependent on improved source data, progress has been slow. There have been partial improvements in some areas, such as improved coverage of nonresidential investment and services, but these improvements have been methodological or based on the quinquennial economic censuses from the Census Bureau or annual data that do little to improve the quarterly estimates. Improvements in source data require new or expanded surveys, which tend to be expensive and impose an expanded burden on respondents. The combination of these factors usually means that the process of developing, funding, obtaining approval for, processing, and incorporating new survey data into the estimates often takes 5 years or more. An extreme example is the new annual capital expenditures survey (ACES) that Census has just sent to respondents. There has never been a consistent and comprehensive source of data for nonresidential investment spending, and the GNP Data Improvement Project Report of 1977 gave high priority to the recommendation that a comprehensive survey of nonresidential investment be inaugurated. Nevertheless, by the time that data from the new ACES survey are actually incorporated into the accounts, there may have been a 20-year lag.

<u>International accounts</u>: The database currently contains over 100 recommendations classified as suggested improvements in the international accounts. The largest number of recommendations are for improvements to the capital account, followed by the current account, and prices.

- *Within the capital account, the largest number of recommendations are for improved estimates of portfolio investment, followed by direct investment.*

- *Among the components of the current account, most of the recommendations focus on improved estimates of services.*

Partly due to the intense interest in trade and foreign investment, and the budgetary resources associated with this interest, improvements in the international accounts have progressed a bit more rapidly than in the national accounts. Processing of merchandise trade data was improved, new and expanded surveys for many categories of international services were inaugurated, and new legislation authorizing data sharing dramatically expanded the detail on foreign direct investment. Many other improvements, however, were of a more temporary nature, such as methodological fixes and the use of data from investment and trading partners to fill gaps in coverage. More fundamental change will rely on improvements in the data collection and processing system and the inauguration of new surveys.

<u>Prices and real GDP</u>: The database currently contains over 60 individual recommendations for better price indexes or constant-dollar estimates. Many of these recommendations address the demands that a more rapidly changing economy puts on price measures. Rapid changes in the nature of goods and services and the pattern of demand require that price indexes be better able to separate price from quality change and that price indexes reflect the shifts in the pattern of demand.

BEA has made progress in developing hedonic prices for computers and multi-family housing, and alternative price indexes that better reflect the changing pattern of demand, but the recommendations for more of this important work still stand.

<u>Other Recommendations</u>: A number of the recommendations address generic issues such as the need for better documentation and increased funding. For example, there are about 50 recommendations that specifically touch on the need for increased funding for the statistical agencies.

These counts of recommendations are only one indicator of the priorities that should be attached to various improvements. Another measure might weight the recommendations based on the size of the component it addresses, that component's relative contribution to errors and revisions, or its importance to policy. By this last criteria, one might give heavy weight to Chairman Greenspan's interest in improved price indexes and improved coverage of new financial instruments.

Table III.1.--Recommendations Affecting National Accounts[2]

Product Side Components[3]	Number of Recommendations	Income Side Components	Number of Recommendations	Other Categories	Number of Recommendations
Personal Consumption Expenditures	40	Compensation of employees	28	Savings and Wealth	20
Gross Private Domestic Investment	81	Proprietors' Income	5	Input-Output Tables	51
Exports/Imports	55	Rental income of persons	5	Prices	56
Government purchases	38	Corporate profits	39	Other	96
		Net interest	9		
		Consumption of fixed capital	8		
		Statistical discrepancy	2		

[2] The categories of this table follow the organization of the summary National Income and Product Account as closely as possible. When a category of that account does not appear in the table, it indicates that there were no recommendations in that area.

[3] The number of recommendations in each category of national accounts does not sum to a meaningful total because recommendations are often relevant to more than one category and are therefore repeated.

Table III.2.--Recommendations Affecting International Accounts[4]

Current Account Components	Number of Recommendations	Capital Account Components	Number of Recommendations	Other Recommendations	Number of Recommendations
Investment income	9	Investment	57	Prices	13
Services	28			Other	35

Table III.3.--Generic and other Recommendations

Recommendations	Number of Recommendations
Generic Recommendations	66
Others	17

[4] Unlike the national accounts recommendations, the majority of the international account recommendations focus on just a few areas of the accounts, (namely, services and investment). Therefore, unlike the case for national accounts recommendations, this table does not attempt to follow the organization of any international account table (such as the U.S. International Transactions Table).

MID-DECADE STRATEGIC REVIEW

OF BEA'S

ECONOMIC ACCOUNTS

Background Papers

Paper IV: Changes in Data Sources and Statistical Methods As They Affect the Economic Accounts

Bureau of Economic Analysis
Economics and Statistics Administration
United States Department of Commerce

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IV. Changes in Data Sources and Statistical Methods As They Affect The Economic Accounts

Overview

Changes in the economy and technology affect data sources and statistical methods underlying the economic accounts as well as policy interests and the complexity and scope of the accounts. Deregulation of the transportation, telecommunications, and finance industries has been accompanied by the disappearance of some of the data once used to monitor and regulate them. Growth in service industries characterized by small firms relative to manufacturing industries characterized by large firms has increased the scope of the data collection effort. The rapid rate of change in the economy also necessitates more frequent updating of sample frames, output and price indexes, and industry classification systems. Changes in tax laws have caused discontinuities in tax-based data used in the accounts. Reductions in government budgets have caused non-statistical agencies to eliminate, or place a lower priority on, those statistics not critical to their central mission.

The troublesome effects of these changes in data sources on the accounts have been partly offset by changes in data collection technology and methods. Advances in computer hardware and software have increased the capacity to process large sample frames, and electronic data collection and transfer methods are beginning to improve data collection and editing techniques. Methodological improvements, including work underway to develop alternative output indexes and the increasing use of data sharing, are also beginning to show promise.

This paper reviews both changes in data sources and statistical methods and suggests areas for further improvement.

Deregulation

The deregulation and reduced regulation of the trucking, railroads, airlines, telecommunications, and finance industries resulted in the dismantling of parts of the data systems used by the regulatory agencies to monitor and regulate these service industries. In addition to their primary use by Federal agencies in monitoring and regulating these industries, the systems provided a large volume of data used by BEA to estimate profits, wages, interest, purchased inputs, sales, investment, stock of plant and equipment, and other components of the national income and product accounts (NIPA's), the input-output accounts, and the wealth accounts.

Although BEA was able to persuade the Department of Transportation and the Securities and Exchange Commission to continue to collect enough data on airlines and the securities industries to meet the national accounts needs, the loss of data on other sectors obtained from regulators has meant that the statistical system has had to expand to collect this information through surveys. Progress has been slow. In the mid-1990's, the information base lost to deregulation in the late 1970's and early 1980's is just beginning to be recovered. In 1992, the Economic Census, in the largest expansion in recent history, added coverage in finance, insurance, and real estate, communications, and public utilities, and expanded coverage of transportation. BEA is working now with the Census Bureau to expand the Annual Services Survey to also cover these industries. Progress is slow in part because of the inevitable delays in developing, funding, and obtaining approval for survey expansions and in collecting, processing, and incorporating the results of new surveys into the accounts. It is also slow because deregulation, in combination with innovation, has contributed to the expansion in these sectors and--particularly in industries such as long-distance trucking and telecommunications--to their transformation from industries dominated by one or more large firms to increasingly competitive industries with increasing numbers of new firms from which data must be collected.

Structural Change and Internationalization

Updating sampling frames and data collection systems

Growth and change in the structure of the economy call for change by statistical systems. Rapid growth--for example, in the number of retail stores or in the nature of retail outlets, such as the emergence of chains of membership "stores" offering warehouse prices--requires more frequent updating of sample frames. If the sample frames are not updated frequently enough, the existing source data will substantially understate growth and result in large revisions such as those that occurred in the July 1993 annual revision of the NIPA's. In another example, the integration in international capital markets resulted in an increase in the volume of direct financial transactions with foreigners that bypassed the existing data collection system, which was based on data collected from U.S. financial intermediaries.

Some progress has been made in capturing transactions in newly emerging channels through a combination of new surveys, data exchanges, and methodological improvements using private data collected for other purposes. New surveys have included BEA's survey of selected international trade in services introduced in 1987, the annual survey of selected domestic services in 1983, the quarterly consumer expenditures survey, and expanded coverage of purchased services in the 1987 and 1992 economic censuses. Although these new and expanded surveys have plugged some of the highest priority gaps in coverage, significant holes remain because these surveys are mainly annual-only surveys and do not cover all services. In addition, as time passes the sample frames for these surveys, like other Census Bureau surveys, will also need updating more frequently than current schedules provide.

In other areas, the use of counterparty data from foreign banks and governments has helped fill gaps in the coverage of international transactions data, and the use of financial market data has helped to improve estimates for international services, investment income, and investment positions. There are, however, at least two problems with such solutions. First, the source data are collected to fulfill foreign government and financial market needs and hence require substantial adjustments--and perhaps introduction of an unknown degree of error--in timing, definition, and concept to make them consistent with the economic accounts. Second, and perhaps more important, such solutions are partial, temporary, and after-the-fact. There is no comprehensive mechanism to detect emerging gaps in coverage. One interesting example of such a comprehensive mechanism, being proposed in Europe, would use balance of payments information that would be encoded in the clearance information used by the bank settlement system. Because such a system is designed to cover, and can be checked against, all transactions, new types of transactions will be either be brought to the attention of the collection system or at worst misclassified.

Less progress has been made in updating sample frames. There has been some limited progress in the use of statistical "bias" adjustments for changes in the sample frame, but more frequent updating of sample frames is ultimately required. Although the Census Bureau's "continuous measurement" methodology does not address the issue of annual sample frames updates, putting this item on the agenda may be a useful way to integrate sample updates with the Census Bureau's current plans.

In the area of prices used to measure real output, BEA has had some success in adjusting and improving data where changes in pricing practices and changes in industry structure have made measurement difficult. The successes include improved price indexes for defense-related goods and services, single family housing, inventories, imports and exports of goods and services, airline fares, trucks, and petroleum prices. Although some of these improvements were joint efforts with source data agencies (Department of Defense, Census Bureau, Bureau of Labor Statistics (BLS), and the Energy Information Administration), many were adjustments developed by BEA to address significant problems that have been identified in the source data. Some form of continuous updating of the price surveys is required if the price data is to be expected to capture changes in the price structure of the economy in a timely manner.

Updating the accounts to reflect changes in industry structure

Updating the industry classification system and reclassifying all the establishments in the economy is a very large and time consuming task. In part because of the size of the project and the discontinuities that are introduced, such projects are undertaken rather infrequently, and the changes have been incremental modifications addressed at resolving the most critical misclassifications and gaps caused by changes in industry structure. As a result, some industries are grouped together according to the similarity of their products from a demand or market perspective; others are grouped together according to the similarity of their products from production or supply perspective; and others are some combination of both. These different and often inconsistent classification schemes arise out of the different needs of users. Analysts interested in changes in productivity are interested in the substitutability of products in terms of the similarity of their inputs or production processes; analysts interested in potential markets and market shares are interested in the substitutability of products in terms of the similarity of the characteristics their products in the eyes of their customers.

As a result of these and other difficulties, the present industrial classification system--the one on which BEA's GDP and gross state product by industry estimates, its input-output accounts, and its foreign direct investment and services data are based--presents an outdated and inconsistent picture of the organization of economic activity. Work toward a new system was begun as a cross-agency U.S. effort in 1992, under the auspices of the Office of Management and Budget and chaired by BEA, and is now being carried forward jointly with our NAFTA partners. The new system will replace the outdated Standard Industrial Classification system for the 1997 Economic Census.

In addition to the effect on industry classifications, accounting for new patterns of industry and product growth presents a challenge for BEA's input-output accounts and GDP by industry estimates. For example, the rise in contracting out for accounting and other business services by firms that previously performed these services internally not only causes discontinuities in BEA's source data but increases the need for more detailed data on purchased services. The rise in the volume of imported inputs used by U.S. firms and the fluctuations in the prices of domestic as compared to imported inputs also has complicated the input-output estimation process. Finally, continuing shifts by small business in their practices regarding leasing versus buying and use of temporary versus permanent employees are especially difficult to estimate because there is no clear trend to such shifts, which tend to be in response to cyclical and tax changes. BEA has made little progress on shifts in small business practices, but has made progress in obtaining additional detail on purchased inputs and in the separate deflation of imported versus domestic inputs. These improvements notwithstanding, these changes and shifts have put additional pressure on BEA's programs.

Updating output and price indexes

As noted in paper II, rapid changes in prices have exacerbated existing problems of substitution bias associated with fixed-weighted output and price indexes. In 1989, BEA introduced alternatives to its fixed-weighted output and price measures that responded to the need for indexes that better reflected on an ongoing basis the effect of changes in relative prices in the economy. The alternative indexes--the chain-type annual weighted quantity index, which uses annual prices for the most recently available year as weights, and the benchmark-years-weighted index, which uses a weighted average of prices in the most recently available year and prices in the most recent benchmark year also provide a means of monitoring the effect of changes in relative prices on the featured 1987-weighted index and a better basis for assessing long-term growth in the economy and for comparing business cycles.

BEA is currently exploring these and other alternative indexes in preparation for this year's benchmark revision of the accounts. Although the alternatives provide more up-to-date weights, the components of GDP must be expressed as indexes rather than "constant-dollars" of a given base year and hence are not additive in constant dollars to total GDP. BEA is working to develop indexes for today's economy that share some of the advantages of both the fixed-weighted and the alternative indexes.

BEA is also exploring extensions of its work on hedonic methods in order to better capture the increasing volume of output that takes the form of improved quality rather than increased quantity. Target areas include "high-tech" products, selected services, and construction.

Taxed-based Source Data

The Statistics of Income (SOI) program at the Internal Revenue Service (IRS) is one of BEA's most important sources of information on profits, interest, taxes, proprietors' income, rental income, dividends, and employer contributions for pension plans. SOI data provides benchmark and annual data for about one-fourth of GDP. Although BEA has always made adjustments to the SOI data for underreporting of income to the IRS, over time, an increasing volume of transactions were occurring in the "underground economy" that were not reported to the IRS and also were not captured by BEA's misreporting adjustments and hence were underreported in the national accounts.

BEA has worked over the years to develop improved adjustments to the SOI data for underreporting in the tax-based data. In 1991, these adjustments to income components were $232 billion. Much of the data for these adjustments are based on the IRS' taxpayer compliance measurement program (TCMP). In recent years, SOI considered dramatically scaling back the TCMP and other programs for budgetary reasons. Although the IRS ultimately decided to continue the program at current levels and the only cost was the loss of 1 year's data, without this data source BEA would not be able to produce accurate adjustments of the important and "underground" sector of the economy.

In addition to frequent changes in tax laws in the 1980's--including changes in the pass-through of income to shareholders, limitations on business entertainment expenses, capitalization of interest, changes in 401(K) plans, and uniform capitalization of inventories--have caused serious discontinuities in the SOI data BEA uses for the economic accounts. These discontinuities are the costs of relying on source data collected for another purpose, which from time to time changes. If the changes are relatively infrequent and external data are available to "bridge" the discontinuities, the difficulties are surmountable. However, as the changes in tax law become more frequent, direct collection of the data for statistical purposes may become necessary.

Perhaps the most important potential change to the tax-based source data BEA uses is tax simplification. A simpler tax code--for example, fewer exemptions and adjustments--reduces IRS' need for detailed information to monitor and administer the tax system. Unfortunately, for many components of national income there are no other reliable data sources. Household surveys, for example, produce unreliable estimates for income data.

Budget Cuts in Agencies Supplying Source Data

The increasing fiscal stringency of the 1980's and 1990's has had an important indirect effect on the national accounts that may become increasingly worrisome. Faced with budget cuts and being asked "to do more with less," agencies have responded by streamlining and cutting lower-priority programs that are not essential to their mission or their "customers." Often these cuts have fallen on data used by BEA and others. Some means needs to be developed to properly weight the efficiencies gained by these dual-use statistics or the Nation will find itself trading off short-term budget gains for long-term economic losses due to the deterioration of the Nation's economic information infrastructure. This problem also should raise serious questions about the Census Bureau's and other agencies' plans to increase the use of administrative records in place of surveys at a time when the very data that is required is being contemplated for elimination from administrative records.

Among the source data that have been eliminated in the agricultural area are the census of agricultural services and the farm crop disposition survey. The SOI group at IRS has reduced sample sizes, dropped the Selected Financial Data program, reduced resources for editing the estimates, and contemplated reducing the scope of the TCMP. The American Housing Survey was cutback from an annual survey to a biennial survey.

In other areas, surveys and programs have been suspended and several years later restored to accommodate temporary budget constraints. These transitional funding problems have had a particularly large impact on the estimates of imports and exports. During the 1980's, the volume of unprocessed Customs forms each month grew so large that revisions of the estimates to incorporate this "carryover" was at times large enough to affect real GDP growth. Funding problems also caused the suspension of processing of Immigration and Naturalization Service data used to estimate foreign travel; incorporation of revised results after processing resumed resulted in a large revision of international services transactions in 1994.

In other cases, sample frames have been reduced and data quality has suffered. Examples include the reduction in the sample size for the monthly Census Bureau surveys of retail trade sales and inventories; manufacturers' shipments, orders, and inventories; value of construction put in place; and merchant wholesalers sales and inventories. Among quarterly surveys, the sample size for the Quarterly Financial Report has been cut drastically. There have even been cutbacks in sample sizes for annual surveys such as the annual Survey of Government Finances.

The budget outlook, however, has not been uniformly negative. As noted above, a number of surveys have been initiated to fill critical gaps in coverage; these included new and expanded surveys of selected domestic and international services, new and expanded data for housing, international trade and petroleum, and introduction of the new annual capital expenditures survey.

Data Sharing

As noted above, use of foreign counterparty data transactions has greatly improved the quality of international capital account estimates with little or no increase in cost. Even larger gains may be possible through the sharing of domestic data. For example, BEA recently statistically linked its data on foreign-owned companies with Census and BLS data on U.S. establishments to develop a new database on foreign-owned establishments. This linked data set dramatically increased the amount of information available on foreign-owned companies--from 55 to 459 industries--with no increase in respondent burden.

Under existing legislation, data sharing opportunities are rather limited among the three general-purpose economic statistics agencies, BEA, BLS, and Census Bureau. If legislation could be passed to allow more data sharing, the statistical programs of all agencies could be improved, and duplicative data requests could be minimized and possibly eliminated, resulting in significant savings to the statistical agencies and the business community.[1]

Data Processing and Estimation Technology

In the face of static or declining budgets and an increasing volume and complexity of transactions that must be measured, improvements in statistical productivity through improvements in information technology are critical. BEA has begun an ambitious program to move to an integrated micro-computer network environment by the FY 1997, when it expects to release its 1970's vintage mainframe. The re-engineering of BEA's data collection, its processing and estimating, and its dissemination will enhance its ability to provide the right numbers at the right time, as described above in terms of accuracy, reliability, and relevance. As well, the re-engineering will enhance its ability to provide the numbers in the right way--the way the customer wants it. So far, it is clear that the customer wants the numbers faster and in a variety of easy-to-access ways.

More specifically, the integrated system will accomplish the following:

- o Reduce respondent burden and increase accuracy and timeliness through electronic filing and data links for BEA's surveys of direct investment and international surveys.
- o Increase accuracy, reliability, and efficiency--across the national, regional, and international programs--through standardized data transfer and on-line interactive editing and processing systems of source data.

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[1] For more detail on data sharing, see Statistics 2000, Census, BEA, and BLS, Task Force Report, July 1993, and "A Comparative Study of Reporting Units in Selected Employer Data Systems," OMB Statistical Policy Working Paper number 16.

- o Increase timeliness of BEA's data products and accessibility for its wide range of customers through use of Internet and other electronic gateways.

Summary

BEA has made progress in a number of areas in offsetting the loss of source data and in coping with the increasing complexity of data collection due to structural change, internationalization, deregulation, tax law changes, and budget cuts. However, challenges remain in several areas:

- *o BEA's progress in adapting to the effects of change in the economy include the use of counterparty data to deal with internationalization; use of data sharing to reduce respondent burden while increasing the quality and volume of data; use of new alternative output and price indexes that include more frequently updated weights; use of hedonic indexes to capture the increasing share of output that takes the form of increased quality rather than quantity; and improved adjustments to tax-based data to account for the underground economy. However, further work is required in improving real output and price indexes, in updating sample frames, in measuring new services, in revamping data collection systems for international capital flows, and in updating industry classification systems.*

- *o The statistical system has still not recovered from the loss of data associated with deregulation of transportation and communications in the late 1970's and early 1980's. BEA is currently working with the Census Bureau to expand the coverage of the annual services survey to all services, including transportation and communications.*

- *o Continued reductions in the availability of tax and other administrative data raise questions about reliance on these data sources. Although it is clear that there are large efficiencies in the dual use of such data, certain generic questions about the use of such data need to be resolved.*

- *o One of the most important improvements that BEA can make to address the problems discussed in this paper is the re-engineering of its information technology system.*

MID-DECADE STRATEGIC REVIEW

OF BEA'S

ECONOMIC ACCOUNTS

Background Papers

Paper V: The Newly Revised International Guidelines for Economic Accounting

Bureau of Economic Analysis
Economics and Statistics Administration
United States Department of Commerce

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U.S. DEPARTMENT OF COMMERCE
BEA
BUREAU OF ECONOMIC ANALYSIS

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V. The Newly Revised International Guidelines for Economic Accounting

Overview

Globalization of trade and financial markets has made international policy coordination, and consistency in the underlying statistics that guide policy, increasingly important for the United States. International policy coordination affects a wide range of economic accounting and policy issues, including the consistent definition of foreign investment and capital flows, trade and industry classifications, external balances, national balance sheets, accounting for government, and accounting for the interaction between the environment and the economy.

In the last decade, the United States took a leadership role in the development of newly revised international economic accounting guidelines found in System of National Accounts 1993 and the Balance of Payments Manual. Adaptation of the U.S. accounts to these new guidelines will not only provide the United States with more consistent statistics for the conduct of policy coordination, but also will provide the framework for modernizing and better integrating the U.S. economic accounts. They will provide guidance in working toward more comprehensive and updated measures of new products such as computer software and new financial instruments, updated price indexes, improved measures of infrastructure, integrated economic and environmental accounts, and better accounting for the roles the several sectors--especially government--play in today's society. This paper describes these and other innovations in economic accounting.

Role of International Guidelines

The general purposes of international standards, or guidelines, in statistics are to guide country statistical offices in the development of their own statistics and, in the interests of international comparability, to serve as a framework in which countries report their statistics to international organizations. The interest in international comparability of statistics dates back at least to the 1920's, when the League of Nations sought to encourage economic statistics and the adoption of uniform methods of presentation, but took a quantum leap in the period immediately after World War II, when international organizations assumed a more active role.

The international statistical guidelines most directly related to economic accounting are the guidelines for national accounts and the balance of payments accounts. The guidelines for national accounts, known as the System of National Accounts (SNA), originated with the United Nations. The third major revision of these guidelines was completed in 1993, under the auspices of five international organizations, with the publication of System of National Accounts 1993.[1] The guidelines for the balance of payments accounts come from the International Monetary Fund (IMF) in the dual context of its responsibility for surveillance of countries' economic policies and provision of financial assistance in support of measures to correct balance of payments disequilibria. The most recent edition of the Balance of Payments Manual (BPM) was also completed in 1993.[2] The fact that the work of revising both sets of guidelines was underway at the same time facilitated an important goal--the increased harmonization of international guidelines in order both to increase the analytical power of the statistics prepared following both of them, and to conserve scarce resources used in preparing the statistics.

The latest revisions of these guidelines were designed in part to bring them up to date with developments in the economies around the world--including many of the same changes affecting the U.S. economy described in another background paper--and with developments in economic accounting, such as those that reflect longer experience with balance sheets and with alternatives to fixed-weighted price indexes. The processes of revision were notable for their openness and breadth, drawing extensively on the country experience. BEA staff participated actively in the work on the new SNA and BPM, both to share U.S. experiences and expertise and to learn from others.

Using the international guidelines (as yet, still the earlier editions), BEA prepares estimates that have been adjusted as far as possible to the required concepts, definitions, accounting rules, and formats for submission to the international organizations. For the national accounts, the annual estimates prepared for this purpose are conversions of the regularly published U.S. estimates to the SNA basis by a series of reconciling adjustments based on underlying detail and related data. (The SNA-basis estimates are published by several international organizations--in the United Nation's annual National Accounts Statistics: Main Aggregates and Detailed Tables, for example.) The balance of payments estimates for the IMF are prepared in the same way, although the U.S. estimates have long been reasonably close to the IMF guidelines.

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[1] Commission of the European Communities, International Monetary Fund, Organisation for Economic Co-operation and Development, United Nations, and World Bank, System of National Accounts 1993 (Brussels, Luxembourg, New York, Paris, Washington, D.C.: Commission of the European Communities, International Monetary Fund, Organisation for Economic Co-operation and Development, United Nations, and World Bank, 1993).

[2] International Monetary Fund, Balance of Payments Manual, Fifth Edition (Washington, D.C.: International Monetary Fund, 1993).

The Revised System Of National Accounts

When the initial SNA appeared in 1953, the structure and scope of that system and the U.S. national income and product accounts (NIPA's) were substantially the same. The 1968 revision of the SNA expanded the international system by incorporating input-output (I-O) tables, financial accounts, and (at least in principle) balance sheets. These additional economic accounts were also developed for the United States, but with exception of the I-O tables, they are not fully integrated with the NIPA's in the sense that the same definitions, classifications, and conventions are used.

In 1993, the SNA was revised again to fill in many of the specifications left incomplete in the 1968 version. This revision also incorporates many conceptual developments in economic accounting regarding the treatment of particular types of economic activity. Thus, the scope and structure of the SNA have advanced beyond the NIPA's and other U.S. economic accounts. Modernizing and extending the existing U.S. accounts to make them fully compatible with the SNA would require extensive work in several areas. One way of categorizing these areas is the following:

o Develop accounts for sectors as well as for the entire economy: The SNA stresses a division of the total economy into several sectors and developing a complete set of accounts for each sector. Estimates for the total economy can then be shown as a sum of the sector estimates. One of the more important advances in the SNA is its separate treatment of households and nonprofit institutions serving households. The NIPA's treat these nonprofit institutions as if they were themselves households. The separation of the two groups improves the ability of the accounts to support analysis of household behavior.

o Improve the statistical picture of government's role in the economy: Compared with the immediate post-World-War-II period, governments influence an increased share of the use and distribution of resources. Economic accounts should differentiate more effectively the various roles played by governments in economic activity and show their relative importance in each area.

o Improve the treatment of financial and insurance services: Banks, insurance companies, and other financial institutions produce financial services, but estimating the output of those services is a problem for economic accounts because their sale is combined with interest payments or insurance premiums. The SNA took several large strides forward by separating financial corporations, including insurance corporations, from nonfinancial corporations and then explicitly defining what they produce, who purchases the output, and how to measure the current-dollar output. Although the recommended methodologies have not received unanimous approval internationally, they are clearly stated and provide a comprehensive solution. The increasing importance of financial services in the U.S. economy and their role in foreign trade reinforces the need to work toward their improved treatment.

- Improve the integration of the NIPA's, financial accounts, and balance sheets: Increasingly, economic analysis draws on estimates from several components of the U.S. accounts, such as combining financial estimates with income and product estimates. Such analysis is more effective if the various components of an accounting system are integrated, consistent definitions and classifications are used throughout, and the related estimates are reconciled.

- Changes that improve the degree of international comparability: Many other countries already follow the 1968 SNA, and even more have announced their intention to follow the 1993 SNA. Following the general structure of the SNA and using its definitions, conventions, and accounts will greatly improve the ability of U.S. analysts to compare estimates from the U.S. accounts with similar estimates from other nations. Further gains will come from harmonizing the accounts with other international guidelines such as for the balance of payments and international classification systems for functions of government and types of household consumption.

To bring the U.S. accounts into conformity with the SNA in these several areas will require changes. The following sections describe the major differences between the SNA and the NIPA's and suggest the kind of work to be done to make the changes.

In addition to the changes in the main body of the accounts, the SNA brought into prominence the use of satellite accounts to increase the flexibility of the accounting system. No single system of economic accounts can adequately support all possible uses of the accounts. The SNA specifically introduces the concept of satellite accounts as a means of making economic accounts more flexible and more capable of meeting multiple goals. Using this flexibility often means changing concepts, such as treating research and development as an investment expenditure rather than a current expense. In other cases, flexibility means simply rearranging existing data, increasing the level of detail, and adding supplementary data to concentrate on a single subject, such as health or education. In all cases, the links between satellite accounts and the base set of economic accounts need to be carefully specified. BEA has always provided supplementary estimates that would qualify as a satellite account, but the SNA provides the framework to place national accounting information in the framework required for particular analytical questions.

Accounts for sectors

<u>Production accounts for enterprises and establishments</u>.--A complete analysis of production and productivity needs to include the total value of the goods and services produced as well as the goods and services consumed in that production. The SNA production account uses this information to derive value added and GDP. The NIPA's do not include full production accounts

except in the I-O tables because the necessary source data are not available. Instead, value added is estimated from the sum of incomes in each sector.

Further, the SNA employs a dual set of production accounts to accommodate both enterprise and establishment classifications. An enterprise classification is desirable because enterprises engage in the full range of transactions in addition to production, such as financial and investment choices. An establishment classification is desirable for a detailed production analysis.

Transactions between households and nonprofits.--The SNA includes a separate sector for nonprofit institutions serving households. While this arrangement permits a better economic analysis of both sectors, it requires estimating all of the flows between the two sectors. In the NIPA's, the sectors are combined and the flows between them do not need to be estimated.

Dual consumption presentation.--Many government-produced services are consumed by individuals. Primary education is an example. The SNA presents personal consumption classified both by who purchases the goods and services and by who consumes them. When classified by purchaser, primary education would be part of government consumption; when classified by consumer, it would be part of household consumption. The dual classification improves the analysis of consumption behavior and the comparability of the accounts with those of other countries. Services subject to this dual classification are produced by governments and nonprofit institutions. The NIPA's show only the expenditure approach, but do include an analysis of government activity by function that supports the consumption approach.

The role of government

Investment expenditures.--To highlight governments' ownership of a large share of a nation's physical resources and the use of those resources in producing government services, the SNA treats government expenditures for the acquisition of structures, equipment and other nonfinancial assets as investment and the annual depreciation of those assets as a cost of current government production. Government saving would be higher in most years with the SNA treatment than with the NIPA treatment.

Government-employee pension funds.--In the NIPA's, the net equity of private pension funds is treated as a financial asset of the employees, but the net equity of government-employee pension funds is treated as the property of government. The primary reason for the differing treatments is the greater level of control governments have over pension funds and, in the case of the Federal Government, the use of the pension fund assets to buy Federal debt securities. The SNA does not distinguish between government and nongovernment pension funds; the net equity of all pension funds is treated as belonging to the employees. Adopting the SNA treatment is the same as treating the government-employee pension funds as a separate sector operating independently of the governments and will require collecting data on all transactions between the funds and the parent governments, most of which can be ignored for compiling the NIPA's. Government saving would be lower in most recent years with the SNA treatment than with the NIPA treatment.

Social insurance funds.--The SNA treats government-operated social insurance funds as distinct entities owned by government. Thus, all transactions between the fund and the government that operates it are shown in the accounts and the estimates of government saving are divided between the social insurance funds and other government operations. Moreover, the SNA treats social insurance funds as a type of insurance business so that payments to the funds are considered contributions or premiums rather than taxes, and payments by the funds are considered to be insurance benefits. In the NIPA's, some of the transactions are consolidated with those of the owning government so that the funds are not treated as independent entities. Converting to the SNA treatment will require more data on transactions between the funds and their governments and information on their stocks of financial assets and liabilities for the construction of balance sheets.

Classification of government functions.--The SNA uses the Classification of Functions of Government developed by the United Nations to allocate expenditures according to their purpose, such as health, education, and defense. The NIPA's use a different, less detailed classification system.

Government enterprises.--Government enterprises are organizations that sell their output for market prices. The SNA treats such organizations as if they were private corporations by constructing complete sets of accounts for them that are independent of the accounts for the rest of the public sector. The NIPA's use a mixed treatment, treating the enterprises as if they were private corporations for production-related transactions and as if they were an ordinary government agency for all other transactions. The SNA treatment requires a more extensive set of data, especially regarding interest paid by enterprises and subsidies received by enterprises. Much of this data for State and local government enterprises is not now collected.

The SNA definition of a government enterprise is less restrictive than the NIPA definition. The intent in both the SNA and the NIPA's is to treat government commercial activities separately from other government activity, but it is difficult to formulate clear criteria for establishing the dividing line. In general, the SNA criteria would classify more government organizations as enterprises than would the NIPA criteria.

Financial and insurance services

A separate sector for financial corporations.--Because financial corporations operate in fundamentally different ways than nonfinancial corporations, the SNA forms a separate financial corporations sector. In the NIPA's, all private corporations are part of the business sector, but one of the supplemental tables estimates the value added of financial corporations. The SNA also recommends subsectors for several types of financial corporations, including pensions funds and insurance companies.

The concept of output.--It is difficult to estimate the output of banks and similar financial institutions because a large share of their sales is implicitly combined with interest payments. The SNA deals with the issue more explicitly and in more detail than do the NIPA's. Regarding the estimation of the total output of banks and similar institutions, the SNA treatment is only catching up with what has long been the NIPA treatment, but the 1993 SNA treatment goes beyond the NIPA's in that it uses a more detailed method for determining which customers pay for the services. Although the SNA is more explicit and detailed than the NIPA's, both systems use the same basic formula to determine the output of insurance services.

Treatment of interest.--Interest is treated as a property income in the SNA for all sectors. In the NIPA's, interest is treated as a cost of production if it is paid by a production enterprise, but not if it is paid by a government or household.

Integration and structure of the accounts

Reconciliation of financial flow accounts and income and product accounts.--The financial flow accounts compiled by the Federal Reserve Board and the NIPA's provide most of the information included in the SNA for domestic sectors. The two sets of accounts should produce identical estimates of net borrowing or lending by each sector. In practice, however, it is often difficult to be sure that the same concepts, definitions, and classifications are followed in both sets of accounts. Following the SNA would require a harmonization of the two sets of accounts, not only for a consistent presentation of the full set of accounts, but to identify and reduce statistical problems.

Summary presentation of the accounting structure.--The NIPA's can be represented by an interlocking set of five summary accounts. This presentation is highly compact and shows the major economic relationships at a glance. The SNA, into addition to dividing the economy into one more sector, classifies economic activity more finely than is done for the NIPA's for the types of economic activity covered by both systems.

Balance sheets.--The SNA is a complete system of economic accounts in that it includes balance sheets and sufficient flow accounts to explain fully all changes from one balance sheet to the next. Balance sheets are currently compiled by the Federal Reserve Board to the extent possible with the currently available data. Completing the system would require expansion of the government accounts to permit the compilation of a government balance sheet and improved estimates of nonproduced assets such as land.

Extended asset boundary.--The SNA includes a larger list of items as assets than do the NIPA's, which concentrate on tangible reproducible assets. The SNA defines assets as all items over which ownership rights can be established that have a multi-year life and return economic benefits to the owner. As a result, the acquisition of intangible produced assets--such as computer software and artistic originals--are treated as investment. Nonproduced assets--such as land, subsoil assets, and intangibles such as patents and leases--are also included. The SNA's list of tangible produced assets is also slightly more inclusive than the NIPA list as it includes cultivated assets, certain livestock, and orchards.

Integrated with rest-of-the-world accounts.--As an integrated economic accounting system, the SNA's domestic accounts are consistent with its international, or rest-of-the-world, accounts. In turn, the definitions, classifications, and conventions in the rest-of-the-world accounts apply to the balance of payments and international investment position. The U.S. national and international accounts are now linked tightly, but some reconciliation entries are required because of slight differences.

More aggregates, gross and net.--A large part of the design of the NIPA's is influenced by the goal of estimating certain aggregate economic measures, such as GDP, personal income, the government deficit, investment, and saving. The SNA includes these aggregates and more. Indeed, each of the SNA accounts is designed to produce an important aggregate, and many of them can be usefully shown as a gross or net measure by including or excluding consumption of fixed capital.

Alignment to improve international comparability

Illegal income.--The SNA does not distinguish between legal and illegal types of economic activity. The NIPA's exclude illegal economic activity by convention and because of a lack of source data.

Accrual versus cash.--The SNA recommends that virtually all transactions be recorded on an accrual basis. Some parts of the NIPA's are recorded on a cash basis.

Capital transfers.--The SNA differentiates between current and capital transfers. Current transfers are regularly recurring payments, and capital transfers are one-time or infrequent transfers usually associated with the purchase or sale of assets. The NIPA's allow for capital transfer between governments and the rest of the world, but otherwise classify all transfer payments as current.

Nonmarket production.--All sectors, but especially governments and nonprofit institutions, engage in production but do not sell their output for market prices. The SNA explicitly recognizes this production and values the output at the cost of its production. The NIPA's implicitly recognize the production, making it more difficult to analyze the production activity.

The Revised *Balance of Payments Manual*

The U.S. balance of payments accounts were first published in 1923, predating the other economic accounts. This early interest in balance of payments accounting reflects the widespread interest in the Nation's economic transactions with foreign countries. Since the early debates between the mercantilist pamphleteers and free-trade economists such as Adam Smith and David Ricardo, the economics profession has had an intense theoretical and empirical interest in the measurement of these transactions.

The available statistical information on international transactions has evolved in response to changes in issues of concern and in the structure and organization of the world economy. The mercantilists were interested in maintaining a positive trade balance as a means of accumulating financial wealth (gold), whereas the free-trade advocates were more concerned with realizing the gains from international trade and specialization. These topics could be broadly addressed with information on trade in major commodities and on changes in stores of monetary gold. Many years later, under the Bretton Woods fixed-exchange-rate system that emerged following World War II, more comprehensive and detailed information was needed to monitor the forces on foreign exchange markets and gauge the need for policy intervention. Over time, gaps in information were filled, and analytical work centered on the development of various "balances" that were intended as indicators of the sustainability of the nation's international payments position and of any need for corrective policy measures. During this period, short-term capital movements tended to be regarded as accommodating flows that in large measure were passive consequences of imbalances in the trade flows. Interest in the capital account was focused on the movements in official reserves needed to settle the imbalances and compensate for short-term disequilibria in foreign exchange markets.

In the 1970's, as the world moved to flexible exchange rates and as world capital markets became more highly integrated, a more symmetric view of the current and capital accounts emerged. The balances on the two accounts were seen as co-determined by trade flows, capital movements, and the exchange rate, rather than one account being a passive byproduct of the other. Under the regime of flexible exchange rates, many of the indicators of balance of payments equilibrium that had been designed under the Bretton Woods system lost their relevance, fell into disuse, and ultimately were discontinued. As trade and investment flows expanded and globalization of international business became a reality, domestic monetary and regulatory policy could no longer focus on just domestic markets, but increasingly had to take into account the effect of policy changes on both domestic and foreign investors. As trade in services grew in importance and took on a more prominent role in U.S. international economic policy initiatives, statistics on this trade were improved and balance of payments accounting guidelines began to provide more detailed guidance on recording it.

Since the Bretton Woods agreement in 1944, the IMF has had primary responsibility for setting international standards for the compilation of balance of payments accounts. In 1993, the IMF released the fifth edition of its BPM. This revised manual, which replaces an edition released in 1977, reflects the interests and concerns of the 1980's and 1990's. Its main features are as follows:

- o Integration of balance of payments accounts with the national accounts as expressed in the IMF's BPM and the SNA: This integration reflects the increased importance placed upon integration of international and domestic concerns in the conduct of monetary, fiscal, and regulatory policies.

- o Increased emphasis on trade in services and newly emerging categories of trade in goods: The accounts have been updated to better portray the composition of trade and to draw sharper distinctions between trade in goods, trade in services, and returns to factors of production.

- o Greater integration of stocks and flows: In recognition of the importance of consistent measurement of the composition and size of inter-country claims and liabilities and of relating capital account transactions to the cumulative stock positions to which they contribute, the BPM now includes a comprehensive methodology for measurement of the international investment position. (Previous editions had covered only balance of payments flows.)

- o Expansion and revision of the capital account: The capital account has been updated to reflect changes in capital markets and the emergence of new financial instruments and intermediaries. The traditional concept of the capital account now has been divided into two separate and distinct segments--a capital account covering capital transfers and transactions in certain intangible assets and a financial account covering changes in the ownership of financial assets and liabilities.

The U.S. took a leadership role in the coordinated international effort that culminated in the release of the new BPM. This role is reflected in the great extent to which the new manual is modeled upon the existing U.S. accounts, especially in areas such as foreign direct investment where the United States is clearly the world's leader. In other areas, the new BPM addresses problems common to the United States and other major industrialized nations with major financial centers such as New York, London, Frankfurt, and Tokyo.

Notwithstanding the role of the U.S. accounts as a model, a number of changes in definitions and conventions would be necessary to bring them into full conformity with the BPM, and in many cases with the SNA. The major changes fall into roughly 20 areas of the accounts, as follows:

Goods

Intellectual property.--In recognition of the need for a broader definition of investment, both the revised SNA and the BPM expand the definition of investment to include purchases of "nonproduced, nonfinancial assets"--broadly, intellectual property, such as rights to trademarks, copyrights, and patents. To implement this change for the international and national accounts, BEA will need to begin to collect sale and purchase transactions in these assets separately from transactions involving their use. Sale and purchase transactions would be recorded in the capital account, while use transactions (for example, royalties and license fees) would continue to be recorded as services.

Investment goods.--In the SNA, repairs to investment goods are treated as capital formation. To increase consistency with the SNA, the BPM recommends that all repairs be recorded as trade in goods rather than, as at present, trade in services.[3] Implementing this change would require BEA to modify its services surveys to segregate repair transactions from other services transactions with which they are presently commingled.

Goods acquired in ports.--The increasing volume of international merchandise trade has resulted in a parallel increase in the volume of air and water port transactions. Traditionally these were recorded in the transportation account as port services, with no distinction between the purchase of goods (such as fuel and supplies) and the purchase of services (such as loading and maintenance). To distinguish trade in goods from trade in services more clearly, goods procured in ports now are to be broken out from port services and recorded as a separate component of trade in goods. Implementation would require a more detailed collection of data on BEA's international transportation surveys.

Services

Affiliated services.--BEA does not currently collect detailed data by type of service on transactions occurring between the domestic and foreign segments of multinational corporations. However, the large and growing volume of affiliated party trade in services and the need to provide trade totals for specific types of services to the IMF, as well as to satisfy U.S. trade policy and business planning needs, suggest that additional detail be collected on BEA's affiliated trade survey questions. BEA is taking an initial step in this direction on its next benchmark survey of U.S. direct investment abroad, where services transactions between U.S. parent companies and their foreign affiliates are for the first time being reported by broad type of service. The services categories selected for separate reporting are compatible with the standard components for services in the BPM.

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[3]Although conceptually one would like to separate repairs to investment goods from those to other goods, the difficulty in collecting such data and the fact that practically all repairs recorded in the international transactions accounts will be to such items as ships, planes, machinery, and equipment, led to the recommendation that all repairs be recorded as repairs to investment goods and recorded under goods.

Goods versus services.--Unbundling of the goods component from services will better focus the existing services estimates (as in the abovementioned cases of goods procured in ports and repair of investment goods).

Rental.--The increasing volume of rental activities led to a recommendation of a finer breakdown by type of rental activity, particularly for transportation equipment. Implementation will require changes in BEA's balance of payments transportation and selected services surveys.

Postal and courier services.--The rapid growth in the international business of private couriers has highlighted the change in the nature of this sector. Implementing the BPM treatment would require moving postal services from government services to communication services and moving courier services from transportation services to communication services.

Insurance.--Currently, insurance transactions are recorded in the current account as premiums less claims, a measure that fluctuates widely and can turn negative when a major disaster such as a hurricane or earthquake occurs. To conform to the BPM, this current-account measure would be replaced by an "insurance service charge"--a measure that more closely tracks current production--and the premiums and claims themselves (less the service charge) would begin to be recorded in the new financial account or under current transfers, depending upon the type of insurance. A major task in implementing this change would be development of a methodology for estimating the insurance service charge.

Construction.--The current U.S. methodology records construction work performed abroad by U.S. contractors on a net basis, as gross operating revenues less foreign expenses and less any U.S. merchandise exports included in gross operating revenues. The BPM recommends a more gross recording methodology, which will facilitate comparisons between construction put in place abroad and that put in place domestically. (The BPM methodology also will be more consistent with BEA's I-O tables.) Implementation would largely involve retabulation of existing data.

Financial services.--The BPM recognizes that an increasing share of the revenue of the financial services industry is derived from the difference between the price financial firms pay for instruments and the price they sell them for. Hence, this revenue is misclassified as capital transactions rather than as output of the financial services industry. The BPM, however, does not offer a methodology and suggests that for practical reasons the revenue should continue to be treated as capital transactions.

Travel.--Several changes are proposed. Among these changes are the separate recording of expenditures for business and personal travel. Implementation of this change would require an expansion of the sample frame of the U.S. Travel and Tourism Administration's in-flight surveys to raise the quality of the responses to the questions relating to this item to an acceptable level of quality for use in the quarterly estimates.[4]

Income

Labor income.--Increasing international labor mobility and the rise in the importance of multinational corporations have contributed to the growing volume of compensation paid to nonresident employees. The BPM calls for such compensation to be recorded as a separate component of factor income, but BEA's balance of payments accounts now record it as a miscellaneous item under "other private services." Bringing the balance of payments treatment into conformance with the BPM will also bring it into conformance with the preferred treatment in the NIPA's. However, before international labor compensation can be moved to a separately identified component of income, steps will need to be taken to upgrade the series.

Unilateral transfers

Capital versus current transfers.--Partly in response to the need for consistency with the SNA and partly because of the large volume of debt forgiveness and rescheduling in the 1980's and 1990's, the BPM recommends removal of capital transfers from the current account. Items such as the cancellation of past debts do not represent the transfer of current production from one nation to another, but simply an asset transfer associated with forgiving past debts. Thus the BPM recommends capital transfers should included in the capital account. Given the complicated mixed nature of U.S. grants and aid for many grants, implementation of this proposal will require resolution on a case-by-case basis.

Current transfers versus services.--As noted above, the recommended methodology for recording certain insurance transactions would entail recording in current transfers transactions that are now recorded in services.

Capital account

Coverage.--The capital account has been expanded and redesignated as the capital and financial account. The capital account will include capital transfers and acquisitions and disposal of nonproduced nonfinancial assets. The financial account will include the financial flows that are part of the existing capital account as well as a set of new financial instruments. The capital account will better measure the expanding range of international transactions in land and subsoil assets, patents, copyrights, trademarks,

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[4]Other changes related to travel include the recording under travel of health- and education-related expenditures by travelers as well as expenditures by nonresident workers. These changes could be implemented by changing the method of recording the current estimates of these items.

franchises, and leases and other transferable contracts. The expanded financial account will better capture the widespread changes in the nature and composition of international financial transactions in recent decades.

Derivatives.--The BPM has significantly expanded its treatment of financial transactions and expanded the scope to include derivatives and a wide range of other new financial instruments. Implementation of this expansion will be one of the most challenging tasks involved in moving to the new manual. Because this area is still evolving, the BPM could not provide detailed guidance on all possible cases. Concepts and definitions will have to be developed, data collection systems developed, and universe-level estimating methodologies constructed.

Affiliated financial entities.--In recent years, as various financial intermediaries have gradually taken on the deposit taking and checking activities that once were confined to commercial banks, the distinction between banks and nonbanks has become blurred. In recognition of this evolution, the BPM recommends treating the capital account transactions of a variety of financial affiliates--including what are referred to as "special purpose entities"--symmetrically with banking affiliates.[5]

International investment position (IIP)

Current cost/market values.--As part of the increased emphasis on integrated stocks and flows, the revised BPM emphasizes the importance of accounting for assets and liabilities in the IIP at market or current value. BEA put its IIP on a market value, or current cost, basis several years ago and hence is ahead of other countries in this regard.

Expansion of the IIP.--BEA's main task in revising the IIP will be the parallel expansion of the IIP to encompass the expansion of the capital account to cover nonproduced nonfinancial assets and the expanded financial account. This will require several steps mentioned above, including the collection of data on sale and purchase transactions in nonproduced nonfinancial assets separately from data on transactions involving their use and developing information on new financial instruments.

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[5]In addition to these changes for financial affiliates, there are a number of other changes in the treatment of direct investment enterprises as part of the coordinated revision of the OECD Benchmark Definition of Foreign Direct Investment and the BPM.

Summary

- *Moving toward the new international SNA will not only make the U.S. accounts comparable to those of other nations but will provide the framework for modernizing and better integrating the accounts. For example, such a move will provide a better integrated picture of the effect of financial holdings and transactions on consumer spending, investment, trade, and other components of GDP. A move toward the SNA will also help provide a more comprehensive picture of the varied and changing role of government.*

- *Within the SNA framework, BEA will address new concepts for measuring computer software, derivatives, financial services, and capital stocks.*

- *As the SNA does for the national accounts, the new IMF BPM will provide a framework for modernizing BEA's international accounts.*

- *Because the SNA and the BPM have been harmonized, many of the improvements--including the treatment of new financial instruments such as derivatives--are required for both systems.*

- *Although many of the changes required to move to the SNA and the BPM are conceptual, a number of changes will require modified, expanded, and, in certain cases, new data collection.*

MID-DECADE STRATEGIC REVIEW

OF BEA'S

ECONOMIC ACCOUNTS

Background Papers

Paper VI: Revisions in the Economic Accounts:
Implications for Improvements

Bureau of Economic Analysis
Economics and Statistics Administration
United States Department of Commerce

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VI. Revisions In the Economic Accounts: Implications for Improvements

Overview

Studies of revisions are often used as a basis for recommendations for improvements. However, revisions can be quite misleading for such purposes. Revisions in series do not necessarily reflect errors, nor does a lack of revision reflect the absence of errors. Thus, the results of such studies must be interpreted carefully. This paper focuses on revisions, but also it includes other statistical indicators of quality, and it comes to the following conclusions:

- *In general, current quarterly estimates of GDP are able to tell us whether the economy is expanding or contracting, if growth is accelerating or decelerating, and whether the growth rate is high or low relative to trend.*

- *The U.S. national accounts compare quite favorably to those of other nations in terms of revisions of GDP.*

- *Despite a relatively good average performance, revisions at certain critical periods and for certain key components of GDP are large.*

- *Revisions to seasonal adjustment factors play a large role in revisions of the GDP quarterly estimates.*

- *Improved methods, such as concurrent seasonal adjustment and econometric modeling, have some--although perhaps limited--potential for improving the early GDP estimates.*

- *Large reductions in revisions will require improvements in the timeliness, frequency, and accuracy of survey data for key series including inventories, construction, services, State and local purchases, and merchandise trade.*

- *Although the evidence is mixed, revisions of GDP appear to account for a substantial share of the errors in short-term econometric forecasts used for business and macroeconomic policy purposes.*

This paper focuses on national estimates, but many of the implications hold for the international and regional estimates as well. First, a large component of national estimates--net exports--comes from the balance of payments accounts. Second, regional estimates are, in many cases, extensions of national estimates and are thus subject to the same problems.

The When and Why of Revisions[1]

For each quarter, BEA's estimates of the national income and product accounts (NIPA's) are prepared in each of the three successive months following the quarter. These are known as the advance, preliminary, and final current estimates. (See box 1.) Early, or "current" estimates are made with the largest amounts of missing, preliminary or partial source data. These current NIPA estimates are made on a best-change basis, with each succeeding quarter representing the best estimate of change from the preceding quarter. BEA's regional accounts and international transactions accounts are also revised periodically following the publication of preliminary estimates for each quarter.

Each quarterly NIPA estimate may be revised in three successive annual revisions that are usually released in July of each year. The first annual revision incorporates further revisions in the monthly or quarterly source data used to make the current estimates and updated seasonal adjustment factors. It also incorporates some newly available annual source data. The second and third annual revisions incorporate a broad range of additional annual source data. The annual source data include surveys and censuses, as well as tabulations from the Internal Revenue Service. In addition, seasonal adjustment factors are revised as data for each additional year is available.

Each quarterly NIPA estimate is also subject to one or more comprehensive "benchmark" revisions. These revisions incorporate information from both quinquennial economic censuses and decennial population censuses. In addition, comprehensive revisions typically include benchmark input-output (I-O) tables (the results of which are incorporated in the NIPA revision), definitional revisions, an updated base year for constant-price estimates, and other retrospective methodological changes.

BEA's preliminary estimates of State personal income for each quarter are released 4 months following the close of the quarter. Preliminary annual estimates based on the quarterly estimates are released in April, 4 months following the close of the reference year. Revised annual estimates based on new national control totals developed as part of the annual NIPA revision and more complete source data are published in August. Revised quarterly estimates are released in October and April. The regional accounts are also revised every 5 years to incorporate the results from the comprehensive NIPA revisions.

BEA's preliminary estimates for the balance of payments for each quarter are released 3 months following the close of the quarter. Revised quarterly estimates are released along with the preliminary estimates for the next quarter. Preliminary annual estimates are released in March, 3 months following the close of the reference year. Revised annual estimates based on

[1]This section and the next one draw heavily from the contents and language of previously published BEA studies of revisions and reliability of the NIPA's, the international accounts, and the regional accounts.

Box VI.1 -- Terminology for the Quarterly Estimates

The terms used in this paper to identify current quarterly estimates of GDP and GNP are the same as those BEA uses in its news releases and Survey articles. The current quarterly estimates consist of a set of three successive estimates: The first, released 1 month after the end of a quarter, is the "advance" estimate; the second, released 1 month later, is the "preliminary" estimate; and the third, released 1 month after that, is the "final" estimate. The report also uses the term "later current estimates," which refers to only the "preliminary" and "final" estimates. The term "latest available estimates" refers to the latest estimates used by each study cited in the report for comparison with the current estimates; in general, the "latest available estimates" are those that incorporate the latest comprehensive and annual revisions of the NIPA's that were conducted prior to the completion of each study.

The terminology for the current estimates described in the preceding paragraph has been used by BEA since July 1988; other terminologies were used prior to that. The following tabulation shows the equivalent terms that BEA has used either in news releases and Survey articles or in its revision studies:

Prepared in:	(1)	(2)	(3)	(4)
First month	Advance	15-day	Preliminary	Preliminary
Second month	Preliminary	45-day	1st revision	Final
Third month	Final	75-day	2nd revision	....

The present terminology is shown in column 1. The terms in columns 2 and 3 were used interchangeably from 1974 to 1988. The terms in column 2 described the elapsed time to complete the estimates after the end of a quarter: The first, about 15 days after; the second, about 45 days after; and the third, about 75 days after. (This terminology was discontinued in 1988, when BEA began releasing its estimates later in the month in response to a change in the schedule for processing monthly merchandise trade forms.) Prior to 1974, only the 15-day and 45-day estimates were prepared, and the terms shown in columns 2 and 4 were used. Prior to 1958, only the 45-day estimate was prepared. (From 1965 to 1985, BEA also prepared a "flash" estimate (also called the "projection" or "minus 15-day" estimate) about 15 days before the end of a quarter; this estimate is not included in this study.)

more complete data from annual surveys are released in June.

Table VI.1 presents, for national, balance of payments, and regional estimates, more detailed information about annual revisions.

Sources of Error Versus Sources of Revision

Revisions in series do not necessarily reflect errors nor does a lack of revision reflect the absence of errors. Revisions due to the replacement of preliminary estimates with those based on more complete source data do reflect errors associated with BEA projections or with the small sample frame used for the early estimates. However, revisions can also reflect changes in accounting conventions that are not the corrections of errors. For example, as the NIPA's are modernized and moved towards the 1993 SNA, revisions will occur that are not related to the correction of previous errors. Table VI.2 summarizes sources of error and change and sources of revisions in NIPA estimates.

Missing months, quarters, or years of source data

Revisions from the advance to the preliminary current estimates are often due to the replacement of BEA's judgmental projections for the third month of the quarter with newly available data for the third month.[2] Two of the largest sources of revisions are the incorporation of Census Bureau data on international trade in goods and on manufacturing and trade inventories. Revisions from the preliminary to the final current estimates are often due to the replacement of BEA's judgmental projections with newly available quarterly data, such as BEA data on international trade in certain services and Census data on corporate profits.

Revisions from the final current to annual and comprehensive benchmark estimates are often due to the replacement of BEA's judgmental projections for the quarters and the year with newly available annual and benchmark data. Some of the largest revisions have come from annual services and manufacturing survey data, and annual State and local government finances data. Data such as State and local government purchases other than structures and labor compensation are available only annually; quarterly estimates must be extrapolated and interpolated.

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[2] Given that contributions of each monthly change do not receive equal weight in determining quarterly changes, the role of judgment is smaller than the one-third weight associated with quarterly levels. For more details, see Young (1993).

Table VI.1.--Annual Revisions

	NIPA	Balance of Payments	Regional (mainly State)
Period revised	- 3 years (+ 1 quarter)	3 or more years (+ 1 quarter)	3 years
Scope of revision	- newly available source data - new seasonal factors - methodological changes	- newly available source data - new seasonal factors - methodological changes	- new national controls - newly available source data - new seasonal factors - methodological changes
Major source data incorporated	1st annual revision: Census Survey of selected services; BLS ES-202 wage data; Dept. of Agriculture Farm Costs & Returns Survey	1st annual revision: updated monthly or quarterly source data on merchandise trade, number of travelers, ocean tonnage, securities transactions, banking transactions, & annual data on business, professional, & technical services	1st annual revision: BLS ES-202 wage data (4th quarter only); Dept. of Defense payroll data; Dept. of Agriculture data; pieces from Social Security and Health Care Financing Administrations, Association of American Railroads, and Census
	2nd annual revision: Census Surveys: Manufacturing, Retail and Wholesale Trade, Government Finance; preliminary IRS corporate & noncorporate returns	2nd annual revision: additional annual source data on services	2nd annual revision: IRS tabulations
	3rd annual revision: revised IRS corporate returns	3rd annual revision: data from benchmark surveys conducted every five years on direct investment, portfolio investment, services	3rd annual revision: County Business Patterns data (from Census)
Sequence in which annual revisions are part	Quarterly estimates: 2 revisions of current estimates, 3 annual revisions and 1 benchmark; thus, a given quarter may be revised as many as 6 times within a 5-year period	Quarterly estimates: 1 revision of current estimates, 4 annual revisions; thus, a given quarter may be revised as many as 5 times within a 4-year period.	Quarterly estimates: 1 revision of current estimates, 3 revisions for preliminary annuals, 3 revisions for revised annuals, & 1 benchmark; thus, a given quarter may be revised as many as 8 times within a 5-year period.

Table VI.2.--Sources of Error and Change and Sources of Revision in GDP

Sources of Error or Change	Sources of Revision	Comments
Missing months, quarters, or years of source data	BEA judgement replaced with source data	New or more timely source data to reduce the need for judgment is a key step to reducing error and revisions.
Preliminary, incomplete, or inconsistent available source data	Preliminary or incomplete source data are replaced by "better" data from progressively more comprehensive surveys or censuses	"Better" source data is a key to reducing errors and revisions
Seasonal adjustment of available source data (revisions are changes in analytical devices and not indicative of errors)	Seasonal factors are revised as more years of data are available and as data are revised	Seasonal adjustments are centered on the year being adjusted; more years of data lead to revisions in seasonal adjustment factors
Bias and sampling or nonsampling errors in available source data from surveys and censuses	Use of progressively more comprehensive surveys or censuses reduces bias and errors	"Better" source data is the key to reducing bias and error
Inadequate timing, valuation, coverage, and definitions in available source data	Replacement of early data with more comprehensive or alternative data that is more consistent with NIPA concepts	"Better" source data is the key to reducing error
Other changes that lead to revisions that are not indicative of errors	Changes in definitions	Changed definitions cause revisions that may be indicators of improvements and not of problems in the estimates
	Changes in methodology (source data and estimating procedure)	Improvements (such as improved coverage of international services) cause revisions that are not indicative of problems in the estimates
	Updating the base year for constant-dollar estimates	Complicates studies of revisions, reduces estimates of growth

Preliminary, incomplete, or inconsistent source data

Revisions from the advance to the preliminary current estimates are often due to the incorporation of revisions in monthly source data associated with more complete reporting. Among the larger sources of revisions are the incorporation of revised Census data on retail trade sales, manufacturing and trade inventories, manufacturers' shipments, and new construction put in place. Revisions from the preliminary to the final current, and from the final current to the annual and comprehensive revision estimates are often due to the introduction of annual and benchmark surveys that are progressively more comprehensive in coverage than the quarterly and monthly data.

Early available source data are often inconsistent with the NIPA's in terms of timing, valuation, coverage, and definitions. The early estimates are often based on preliminary source data that has been adjusted by BEA to produce an estimate consistent with NIPA concepts. Revisions in the quarterly and annual estimates can come from the replacement of BEA's early estimates with more comprehensive source data or alternative data sources that are more consistent with NIPA concepts, such as corporate profits where tabulations of tax-return data for all industries replace tabulations of publicly available shareholder reports. The tax return data are more consistent and are based on accounting concepts that are more consistent with those used in the NIPA's.

Seasonal adjustment

Revisions due to the updating of seasonal factors are not indicative of errors. As discussed below, seasonal factors are analytic devices that help to isolate trends and cycles from "normal" seasonal fluctuations. Because the reference period for calculating seasonal factors is arbitrary, and alternative methodologies would yield somewhat different seasonal factors, changes in seasonals reflect both changes in the analysis of data as well as revisions to the unadjusted data. Changes in seasonal factors can result in large revisions in seasonally adjusted estimates with no changes in the unadjusted data.

Seasonal adjustments for the current year are derived from the seasonal patterns of the preceding years, usually the last 10 years, with the highest weights on the most recent years. The seasonal factors are revised, usually each year, as an additional year of data becomes available.

Bias and sampling or nonsampling errors in available source data

Sampling error accounts for a large portion of the revisions in the sequence of current estimates of the NIPA's. Nonsampling error and late responses are also important sources of revision. Births and deaths of companies that are not caught immediately are a major source of error.

Sectors of the economy that are not measured, or poorly measured, such as international trade in services, result in measurement errors and possible bias in the estimates. However, unless new or revised data are introduced into estimates, the magnitude of the errors is unknown. Bad data that is never revised surely causes errors, but will never be reflected in conventional revision studies.

Inadequate timing, valuation, coverage, and definitions in source data

The recording of imports and exports of goods provides an example of timing error; to the extent that there is a discrepancy in the recording of an import or export and a corresponding recording of shipments or inventories, there will be a timing error. Source data are often not consistent with NIPA concepts of valuation and may differ in definition. Misreporting of income and expenses and nonfiling of tax returns contribute to errors of coverage. In addition, the economy is in a process of constant change and gaps in coverage may result. These gaps can often only be covered by revisions to surveys or new surveys. Recent examples of where there have been gaps are consumer expenditures for rentals of video tapes of entertainment programs and the increasing prominence of international trade in various types of services. Another example of the types of gaps that affect the NIPA's is the lack of information on construction inputs used in compiling the I-O tables, which are used to benchmark the NIPA's.

Changes incorporated in comprehensive revisions

Some changes produce revisions that indicate improvements to the accounts rather than ongoing estimation problems. Definitions are changed to reflect new developments in theory or in the economy. An example of definitional revision was the treatment of Commodity Credit Corporation loans, which resulted in large revisions to government purchases and business inventories, but very little to GDP. Methodologies are changed when improvements have been developed (such as the introduction of improved price indexes for computers, airlines, and multi-family housing) or when improved source data are developed. An example of the latter is the improvements that have occurred in the estimates for international services flows. The large revisions in recent years reflect the incorporation of new and expanded survey data, increased use of counterparty data, and improved estimation methods. The introduction of these improved source data result in revisions that are indicative of past errors in the data, but they are not indicative of needed improvements in the current estimates. Indeed, some of the components that are the largest sources of revisions in the historical data are areas where the most improvement has occurred.

Updating the base year for constant-dollar estimates

Updating the base year--recognizable as the year used to modify real dollars in, for example, billions of 1987 dollars--leads to changes in the real magnitudes of product-side NIPA measures such as personal consumption expenditures, business investment, net exports, and government purchases. The base year changes so that the price weights will be more reflective of current economic conditions. This updating complicates revision studies. Generally, the updating has the effect of reducing estimates of the rate of growth of real GDP and GNP. For individual components, real-growth revisions tend to be significantly upward, but reweighting tends to lower the importance of fast-growing components and raise the importance of slow-growing components. Components with declining relative prices tend to increase more rapidly as demand for them increases in response to the declining relative prices, but moving to a later base year lowers their weight in real gross product. For example, the prices of personal computers have been declining, and the number of units shipped (and their computing power) has been increasing rapidly. The change from 1982 to 1987 as the base year for prices at the time of the comprehensive benchmark revision that was released in December 1991 reduced the relative importance of computers in the total real economy. In all, most of the 0.2 percentage point downward revision in the trend growth of real GDP was due to updating the base period for prices.

Studies of revisions in constant-dollar measures are better done with measures whose changes are little affected by changes in weights due to changes in base years for prices. These include chain or benchmark-year weighted quantity indexes. Because BEA has been producing these indexes only for a rather short time, such studies have not yet been done.

Revisions in the National Accounts

BEA has done a number of studies of revisions in the NIPA's. In the last decade alone, these include Parker (1984), Carson and Jaszi (1986), Young (1987, 1993, 1994), de Leeuw (1990), Donahoe (1990), and Parker and Weadock (1994). The findings of these studies have been generally similar, and the later studies have typically built on earlier BEA studies.

Many of the internal studies featured estimates of dispersion and bias of estimates of GNP (or GDP) and its major components (table VI.3). Dispersion is also referred to as the average or mean of the absolute values of the revision. Typically it is calculated using percent changes from quarter to quarter, at annual rates:

$$\sum |P - L| / n$$

where P is the percentage change in the current estimates
L is the percentage change in the latest estimates
n is the number of quarterly changes.

Bias is the average or mean of the values of the revisions:

$$\sum (P - L) / n.$$

Table VI.3.—Measures of Revisions in Quarterly Changes in GNP and GDP

	Percentage points[1]					
	Dispersion			Bias		
	Advance	Prelimi-nary	Final	Advance	Prelimi-nary	Final
	Current-dollar estimates					
Gross national product:						
Study I:						
1947–56/r/	....	3.5	....	....	−1.0	....
1947–52	....	3.3	....	....	−1.2	....
1953–56	....	2.1	....	....	−0.8	....
1957–61	....	1.2	....	....	−0.1	....
Study II:						
1947–63/r/	....	3.1	....	....	−0.9	....
1958–63/r/	1.6	....	....	−0.3	....	....
1964–71	1.2	1.0	....	−0.8	−0.6	....
Study III:						
1968–72/r/	1.1	1.1	....	−0.7	−0.6	....
1973–77	2.4	2.2	....	−1.0	−0.6	....
1978–83	1.9	1.5	1.5	−0.6	−0.5	−0.2
Study IV:						
1968–77/r/	2.1	1.8	....	−1.0	−0.7	....
1978–86	1.7	1.5	1.5	−0.5	−0.3	−0.2
Study V:						
1978–82/r/	2.0	1.8	1.6	−1.0	−0.7	−0.3
1983–91	1.2	1.2	1.2	−0.3	−0.2	−0.3
Gross domestic product:						
Study V:						
1978–82/r/	1.9	1.8	1.6	−0.9	−0.6	−0.3
1983–91	1.2	1.1	1.2	−0.2	−0.1	−0.2
	Constant-dollar estimates					
Gross national product:						
Study I:						
1947–56/r/	....	....	....	....	....	....
1947–52	....	....	....	....	....	....
1953–56	....	....	....	....	....	....
1957–61	....	....	....	....	....	....
Study II:						
1947–63/r/	....	....	....	....	....	....
1958–63/r/	....	....	....	....	....	....
1964–72/2/	1.0	1.0	....	0.1	−0.2	....
Study III:						
1968–72/r/	1.4	1.3	....	−0.2	−0.2	....
1973–77	2.0	1.8	....	−0.6	−0.4	....
1978–83	1.5	1.3	1.2	−0.7	−0.5	−0.1
Study IV:						
1968–77/r/	2.4	2.4	....	0.0	0.2	....
1978–86	1.5	1.4	1.5	−0.4	−0.3	−0.2
Study V:						
1978–82/r/	1.6	1.6	1.7	−0.6	−0.4	−0.1
1983–91	1.3	1.2	1.3	0.0	0.1	0.0
Gross domestic product:						
Study V:						
1978–82/r/	1.6	1.7	1.8	−0.5	−0.3	−0.1
1983–91	1.3	1.3	1.3	0.1	0.1	0.0

r. Estimates for this period incorporate one or more comprehensive revisions.
1. Calculated from quarterly percentage changes at seasonally adjusted annual rates.
2. For the constant-dollar estimates, revisions in the advance estimates are for 1966–71, and those for the preliminary estimates, 1965–71.

Note.—The "latest available" estimates used for each study are as follows:

Study I.—The first line uses as "latest available" estimates those from the comprehensive revision in 1958, which incorporated information from the 1954 Economic Censuses. The next three lines use as "latest available" estimates those from the annual revisions in 1955, 1957, and 1963, respectively; in general, these estimates had not undergone a comprehensive revision. See George Jaszi, "The Quarterly National Income and Product Accounts of the United States, 1942–62," *National Income and Wealth Series XI, Studies in Short-Term National Accounts and Long-Term Economic Growth*, pp. 129–141.

Study II.—The first two lines use as "latest available" estimates those from the comprehensive revision in 1965, which incorporated information from the 1958 economic Censuses; the 1958–63 period is included because the "preliminary" estimate was introduced in 1958. The third line uses as "latest available" estimates those from successive annual revisions. See Allan H. Young, *Reliability of the Quarterly National Income and Product Accounts of the United States, 1947–71*, Bureau of Economic Analysis Staff Paper No. 23, July 1974, pp. 6–30.

Study III.—The first line uses as "latest available" estimates those from the comprehensive revisions in 1976 and 1980, which incorporated information from the 1963, 1967, and 1972 Economic Censuses. The second line uses as "latest available" estimates those from the comprehensive revision in 1980, which did not fully incorporate economic census information in that the 1977 Economic Censuses had not yet been fully incorporated. The third line uses as "latest available" estimates those from the annual revisions in 1983 and 1984. See Robert P. Parker, "Revisions to the Initial Estimates of Quarterly Gross National Product of the United States, 1968–83," paper presented at Seminar on Provisional and Revised Estimates of Economic Data, University of Florence, Florence, Italy, November 1984.

Study IV.—The first line uses as "latest available" estimates those from the comprehensive revision in 1985, which incorporated information from the 1977 Economic Censuses. The second line uses as "latest available" estimates, for 1978–82 those from the comprehensive revision in 1985, which did not fully incorporate economic census information in that the 1982 Economic Censuses had not yet been fully incorporated, for 1983–85 those from the annual revision in 1986, and for 1986 those available prior to the annual revision in 1987. See Allan H. Young, "Evaluation of the GNP Estimates," SURVEY OF CURRENT BUSINESS 67 (August 1987): 18–42.

Study V.—The first line uses as "latest available" estimates those from the comprehensive revision in 1991, which incorporated information from the 1982 Economic Censuses. The second line uses as "latest available" estimates for 1983–88 those from the comprehensive revision in 1991, which did not fully incorporate economic census information in that the 1987 Economic Censuses had not yet been fully incorporated, and for 1989–91 those available prior to the annual revision in 1993.

Aggregate revisions

In general, the revision studies done at BEA indicate that the current estimates of GDP are able to tell us whether the economy is expanding or contracting, if growth is accelerating or decelerating, and whether the growth rate is high or low relative to trend. However, their ability to do so is least when economic growth is hovering near zero and--although the evidence is less clear on this point--at turning points in the economy.

- o Over the 1978-91 period examined by Young (1993), BEA's current estimates--advance, preliminary, and final--correctly indicated the direction of change in real GDP between 88 and 89 percent of the time (see table VI.4 and chart VI.1); if quarters where growth is 1 percent or less are excluded, the percentage correct rises to between 92 and 94 percent.

- o The current estimates correctly indicated whether real GDP was accelerating or decelerating between 75 and 78 percent of the time; if quarters where growth was 1 percent or less are excluded, the percentage correct rises to between 81 and 86 percent.

- o The estimates also correctly indicated high versus low economic growth--more than + 4 percent growth or less than + 1 percent--between 66 and 75 percent of the time.

- o Although large revisions in certain "critical" quarters and revisions in the accounts for some recent periods--the 1990 to 1991 recession and 1991 to 1992 recovery--have attracted public attention, there is little evidence from prior years to suggest that revisions in the current estimates have been substantially larger in critical quarters than during other quarters (table VI.5).

- o The dispersion in the current estimates of real GDP during the 1983-91 period was 1.3 percentage points, or between 37 and 40 percent of the average real GDP growth of 3.5 percent during this period. Bias was small and averaged between 0 and 0.1 percentage point, or between 1 and 4 percent of average real GDP growth, during the period.

- o Revisions in the "advance" estimates of GDP are about the same size as those in the "preliminary" and "final" estimates. In general, revisions in the advance estimates of the major GDP components are also about the same size as those in later estimates.

Given this record, how well do the accounts provide a picture of the economy? As can be seen from chart VI.2, the current estimates of GDP did a reasonably good job of indicating the order of magnitude of the later revised estimates that are based on more complete source data. However, as de Leeuw (1990) has pointed out, whether the average revision is large or not depends on its context and the intended use of the data. For example, an upward revision of 1.3 percentage points in real GDP growth from an average during the 1980's of 3.5 percent would be viewed by policy makers and business as a substantial revision in real GDP growth. However, an unbiased average

Table VI.4.−−Reliability of Current Estimates of Quarterly Changes in Real GDP, 1978−91

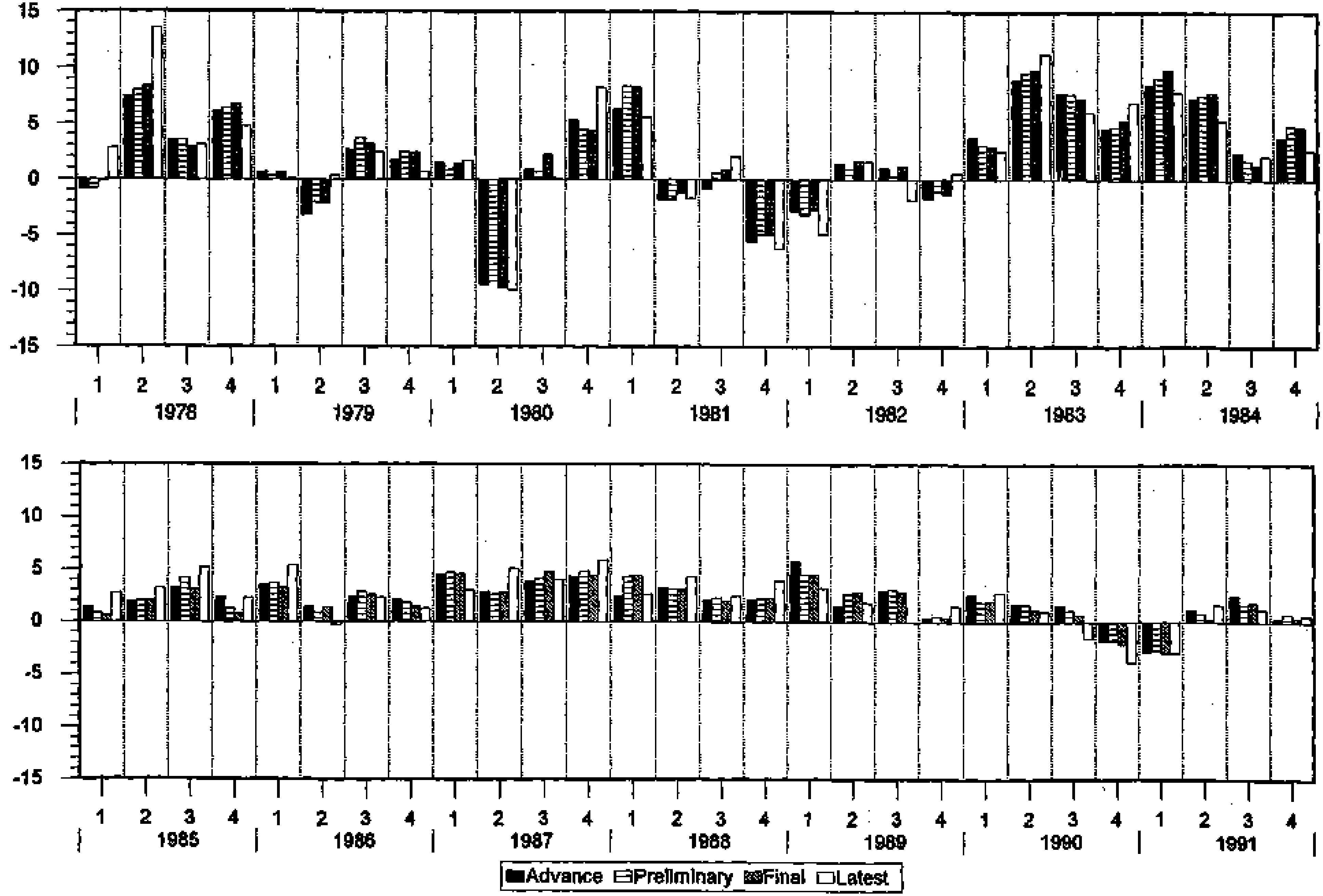
[Percentages providing correct indication]

	All quarters			Omitting quarters with changes/differences of 1 percent or less	
	Direction of change (56)	Larger/smaller change than in previous quarters (55)	Change between +1 percent and +4 percent (56)	Direction of change (48)	Larger/smaller change than in previous quarters (43)
Advance	88	78	75	92	88
Preliminary	89	75	70	94	81
Final	89	76	68	94	84

Note.−−The number of comparisons is shown in parentheses.

Chart VI.1.--Successive Estimates of Quarterly Changes in Real GDP, 1978:I - 1991:IV

[Percent]



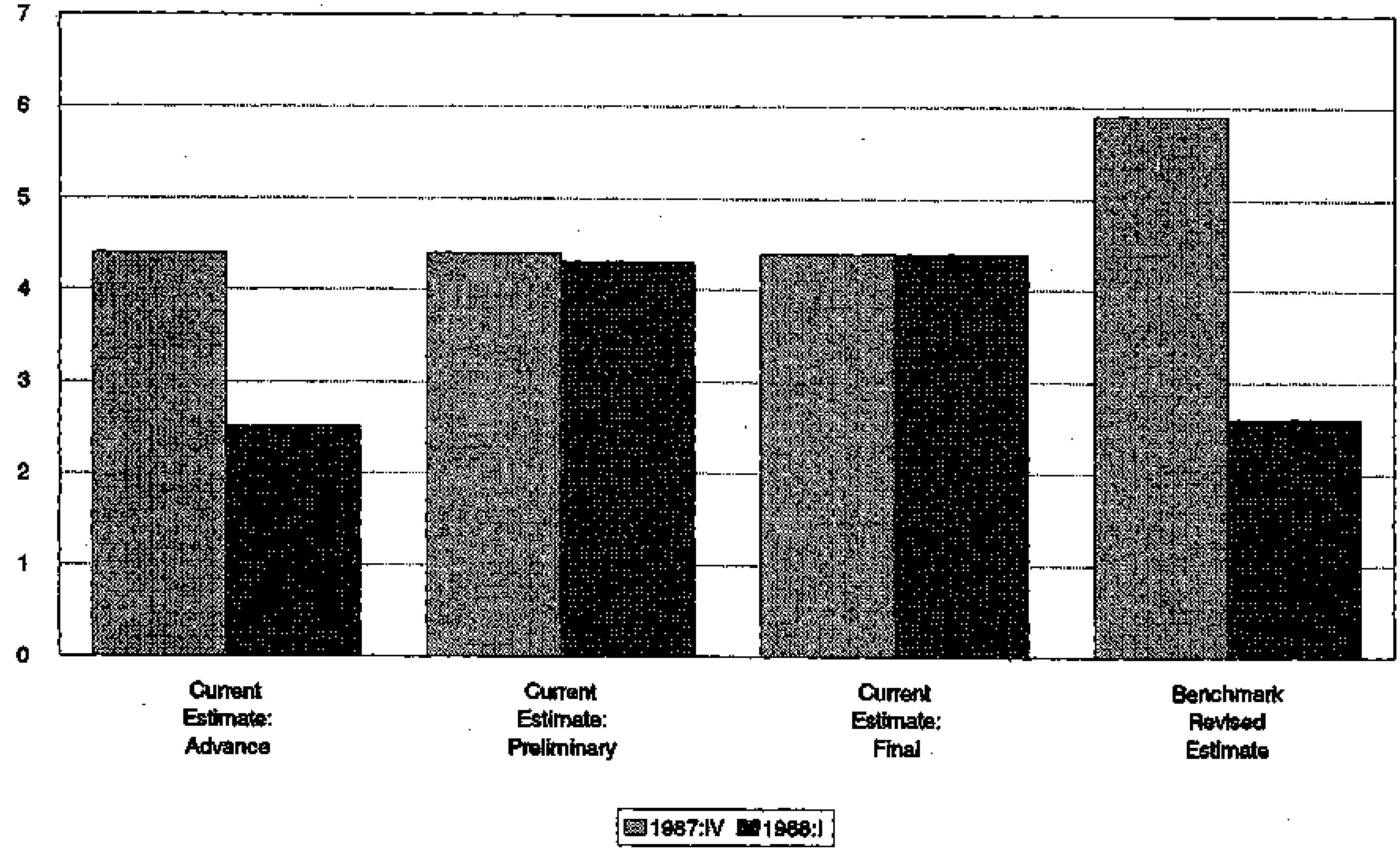
Based on changes of seasonally adjusted annual rates.

Table VI.5.— —Estimates of GNP in Critical Quarters in the Period 1968–1983

	Dispersion	Bias	Percent: Relative dispersion	Percent: Relative bias
	(Billions of constant dollars)			
Based on dollar changes:				
All quarters	5.1	−1.6	37	−19
Critical quarters	4.9	−1.8	48	84
	(Percentage points)			
Based on percent changes:				
All quarters	1.6	−0.5	37	−17
Critical quarters	1.8	−0.6	51	134
Updated: 1968–86, based on percent changes:				
All quarters	2.0	−0.2	50	−1
Critical quarters	2.2	−0.7	68	113

Chart VI.2.--Successive Estimates of Quarterly Changes in Real GDP, 1987:IV and 1988:I

[Percent]



Seasonally adjusted annual rates.

revision of plus or minus 1.3 percentage points in an economy whose real growth varied between minus 9.9 and plus 11.3 percent during the 1980's would seem far less substantial (especially when real quarterly GDP growth differed from its mean by an average of 3.3 percentage points during this period).

Another way of looking at revisions is to examine specific periods. From this perspective, the revisions appear a bit more troublesome. For example, following the stock market crash in the fourth quarter of 1987, the advance estimate of real GDP showed growth dropping sharply, from 4.4 percent in the fourth quarter to 2.5 percent in the first. However, over the next 2 months, the sharp slowdown in real GDP was revised away as real GDP growth in the first quarter was revised up first to 4.3 percent, and then to 4.4 percent. More recent revisions have reversed those current revisions and show an even larger drop in real GDP growth than shown in the advance estimates, with real GDP growth dropping from 5.9 in the fourth quarter of 1987 to 2.6 percent in the first quarter of 1988 (chart VI.2).

A second example is from the recession in 1990 and 1991. As can be seen from chart VI.3, the first annual revised estimates of real GDP showed a substantially different picture than did the earlier estimates. According to the annual revision released in July 1992, the cyclical peak in real GDP occurred one quarter earlier than was initially estimated and the contraction was deeper than previously estimated. In their annual report for 1993, the Council of Economic Advisers noted that the reliability of such estimates are critical to policy makers and the public and commented, "Policy might have been conducted in a different fashion if the true severity of the recession had been known earlier."[3]

A final example illustrates the way in which GDP revisions affect, or are perceived to affect, the public. The example relates to real GDP growth in the quarters leading up to the Presidential election. In the weeks before the November 1992 election, BEA released its initial estimate of real GDP growth for the third quarter. The estimate was nearly twice the "consensus" forecast by private forecasters, and BEA was accused by some of "cooking the books" with an overestimate of real GDP growth to assist President Bush in his re-election. (It should be noted that the General Accounting Office, which investigated these allegations of BEA manipulating GDP estimates, exonerated BEA of the charges.)

In its annual revision of August 1993, BEA's revised estimates not only showed that the third-quarter estimate held up on the basis of more complete source data, but also that the recent recession was less severe, and the economic recovery stronger, than previously estimated (chart VI.4).

The estimate of the level of GDP at the trough was revised up, making the recession less severe. Real GDP growth during the recovery--from the first quarter of 1991 to the second quarter of 1993--was revised up from 2.0

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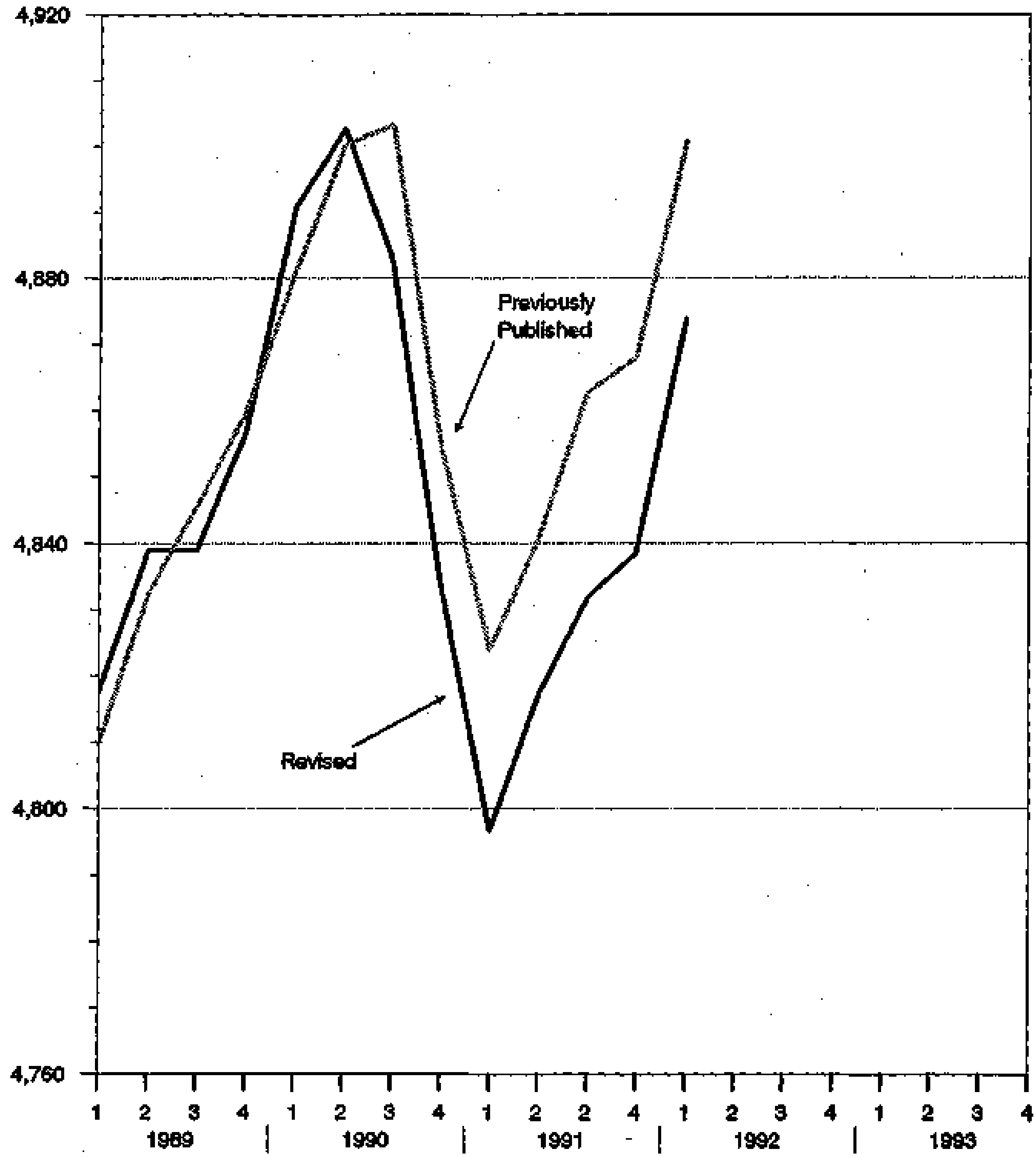
[3] The President's Council of Economic Advisers, the 1993 Annual Report of the Council of Economic Advisers, p. 61, Washington D.C., January 1993.

Chart VI.3.--Real Gross Domestic Product
Annual Revision of 1992
Revised and Previously Published
1989:I - 1992:I

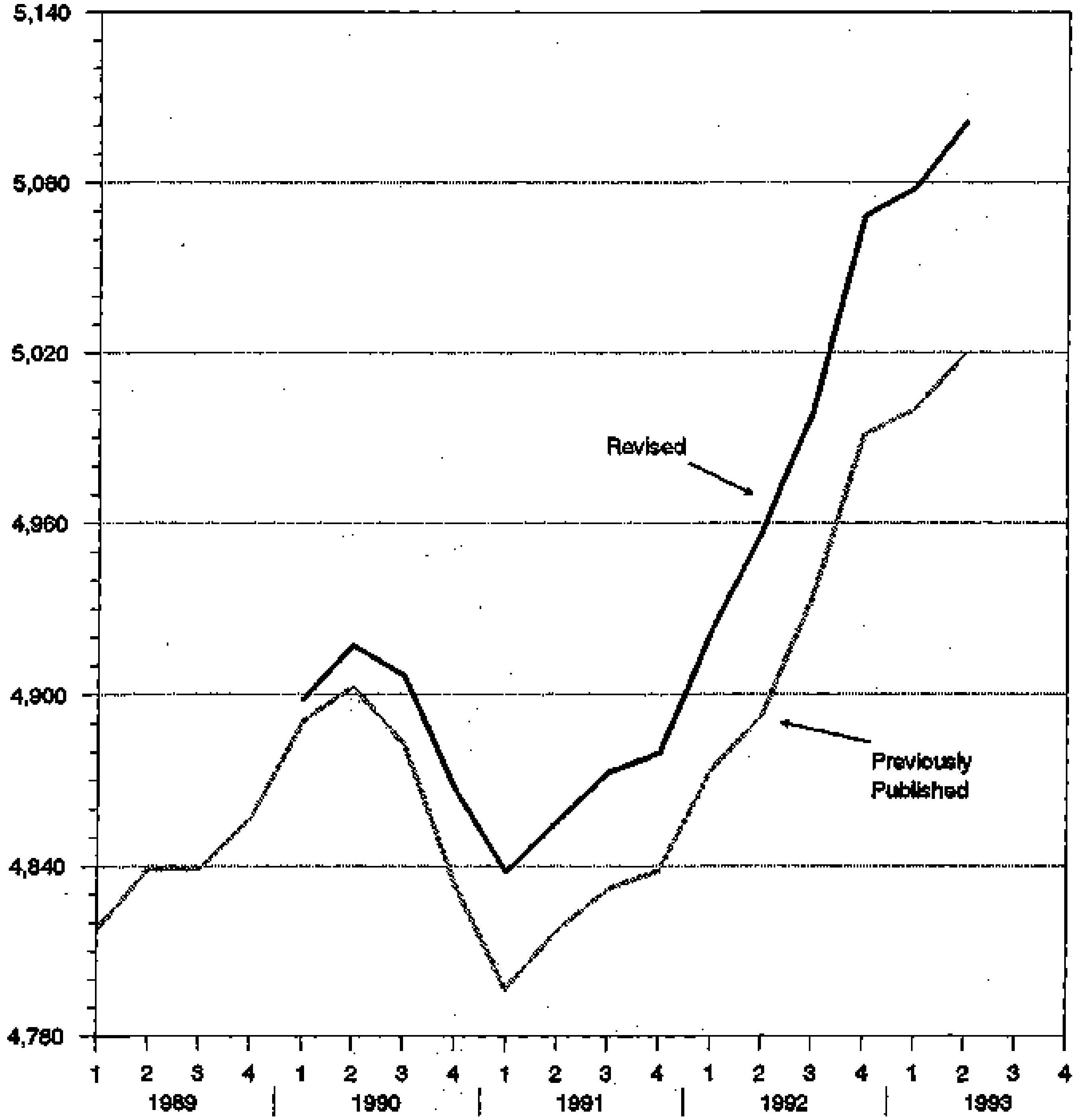
[Billion 1987 $]



Seasonally adjusted annual rates.

Chart VI.4.--Real Gross Domestic Product
Annual Revision of 1993
Revised and Previously Published
1990:I - 1993:II

[Billion 1987 $]



Seasonally adjusted annual rates.

to 2.4 percent and, as described in the August 1993 Survey of Current Business, "the preceding peak in real GDP was surpassed in the second quarter of 1992, one quarter earlier than in the previously published estimates." (p. 10) Ironically, this portion of BEA's description of the revisions did not escape press attention and several writers speculated on the adverse effect on President Bush's re-election of BEA's earlier underestimation of the strength of the economy.

Sources of the revisions to GDP

Seasonal adjustment.--One of the sources of large revisions in many periods and one that affects most of the components of GDP is seasonal adjustment. Young (1993) estimated that about half of the revisions to the current estimates stem from revisions to seasonal factors. According to Young, the average absolute revision in quarterly changes in the seasonal factors for 1983-88 was 0.8 percentage points, which is roughly half the 1.3 percentage point revision in real GDP from the current estimates in recent years. For some series, especially those for which there are no quarterly source data and the estimates are mainly interpolations (such as State and local government purchases other than structures) there is little or no effect from the revision of seasonal factors. For other series, particularly in volatile series such as merchandise trade, inventories, and structures, the effect of revisions in seasonal adjustments is very large, although in many cases, the revisions shift growth between adjacent quarters and have little effect on the general picture of economic growth.

Revisions to seasonal factors can result in large revisions in the seasonally adjusted data even if there is no revision in the unadjusted data. Because seasonal adjustments are centered in time, seasonal factors are updated to reflect more recent reference periods and the effects of revisions in patterns in the underlying source data. Of these two factors the more important is probably the updating of the reference period; for some of the most volatile series, such as merchandise trade where there is now little revision in the underlying source data, updating the reference period accounts for virtually all the revisions in seasonal factors.

Future revisions may be reduced because BEA is using more rigorous criteria in deciding whether a series has seasonality and needs to be adjusted. As a result, BEA has been seasonally adjusting fewer detailed series, thereby reducing the number of series revised due to the updating of seasonals.

There are two other methods that have been used to reduce the size of revisions due to the incorporation of updated seasonal factors. One uses an econometric projection of the unadjusted monthly series for 1 or more years past the year for which actual source data are available. This method is designed to capture changes in the underlying seasonal fluctuations, such as shifts in pre-Christmas consumer spending from December to November. BEA has used this method selectively, but it does not work well for series with large fluctuations in the regular component of the series. The second method, which has shown some promise (Young 1994, and Parker and Weadock 1994), is known as "concurrent" seasonal adjustment because it updates the factors on a continuous basis. At present, agencies that use this method, use the updated factor for only the most recent 1 or 2 months. To be effective at reducing revisions in quarterly GDP, the updated seasonal factors would have to be used for the past year or so. To do so, however, would require more revisions to each quarterly estimate. For example, it might require BEA to revise four quarters of GDP estimates with each release.

These improvements notwithstanding, a large part of the problem with the "measurement" of seasonal adjustments will continue to be that they are not measurement, but analysis. There is no such thing as a "correct" seasonal factor. Seasonal adjustment is an analytic device that helps to isolate trend and cycle from "normal" seasonal effects.

Personal consumption expenditures.--Although the dispersion in PCE is roughly equal to that of GDP for the period 1983-91--1.4 percentage points as compared to 1.2 percentage points for current-dollar GDP and 1.3 to 1.4 percentage points as compared to 1.3 percentage points for constant-dollar GDP--because of the large size of PCE, its revisions, measured in dollars, are about three-quarters the size of revisions in GDP (table VI.6). Among the components of PCE, the largest revisions measured in percentage points are in durable goods; the largest dollar revisions are in services (table VI.7)

One major source of revisions in PCE from the "final" current estimate to the latest estimates arises from the births and deaths of business firms. There is a substantial lag before births and deaths of new firms are reflected in the retail trade survey. This problem has become particularly difficult as the pace of change in the economy has increased. Particularly large revisions in PCE in the 1993 annual revisions were in part due to revisions that reflected the incorporation of the large and growing number of discount "clubs," which had not been included in the monthly retail trade survey. Parker and Weadock (1994) have suggested that such revisions could be significantly reduced, if instead of waiting many years until a regular benchmark revision, source data agencies could continuously track births and deaths and adjust their series annually, even with a 1-year lag. Alternatively, for series where benchmark revisions are not carried backwards in time by the source-data agencies, they could publish the amount of the sample "drift" since the last benchmark. If it were not possible for the agency to use the drift to adjust the data, then BEA and other users could make their own adjustments.

There are also substantial month-to-month revisions in the retail trade source data that are simply the result of the small size of the monthly retail trade survey, particularly for the initial estimates. Restoring the previous cutbacks in sample size and or requiring mandatory reporting would improve the accuracy of these early estimates.

PCE for services are estimated by a wide range of methods, and the sources of the revisions are quite diverse although they are mainly due to the replacement of judgmental projections with partial source data. For revisions from the "final" current estimates to the first annual revision, revisions are largely due to the lagged incorporation of quarterly data on various services

Table VI.6.— —Dispersion in Revisions of Quarterly Changes in GDP and Components: 1983–91

	Billions of dollars		
	Advance	Preliminary	Final
Gross Domestic Product	12.3	12.2	12.6
Personal consumption expenditures	10.0	9.5	9.3
Durable goods	3.8	3.7	3.6
Nondurable goods	4.5	3.6	3.6
Services	5.6	5.7	6.0
Gross private domestic investment	14.7	14.2	14.4
Fixed nonresidential investment	4.3	3.4	3.6
Residential investment	2.2	2.0	2.0
Change in business inventories	12.9	13.2	13.8
Net exports of goods and services	8.2	7.3	7.5
Exports	4.8	4.2	4.7
Imports	6.1	7.8	7.9
Government purchases	8.0	8.2	8.3
Federal	7.7	7.6	7.8
State and local	2.1	2.2	2.3

Based on changes at seasonally adjusted annual rates.

from Census/BLS consumer expenditure survey, monthly data on residential energy use from the Energy Information Agency's survey of energy use, and a large and diverse volume of data obtained from a variety of government agencies and trade associations.

For many services there are no monthly or quarterly data, although there are annual data. For these categories, the main source of revisions are the annual revisions, and often the annual data on these services are only available in time for the second annual revision of GDP estimates. With such long lags in the incorporation of source data, the quarterly estimates can get very far off track. One frequent source of revisions is the incorporation of annual data from the Census Bureau's selected services annual survey and from the Health Care Financing Administration's (HCFA) estimates of premiums and claims for health insurance. The introduction of quarterly surveys--or expedited and improved annual surveys--for services, such as for the important and rapidly growing medical care category, would significantly improve the services estimates. Extrapolations based on more timely I-O benchmarks that incorporate recent information on changes in economic trends should also significantly improve the services estimates.

For many other types of services, the only comprehensive source data are the data collected in the quinquennial economic censuses. (It was only in the most recent economic census that data for many categories of services were collected.) Because comprehensive data for these categories has not yet been incorporated in the PCE estimates, these categories are not yet the source of substantial revisions. However, they may have been the source of substantial, but unknown, error. The addition of annual surveys for these categories--construction, transportation, finance, insurance, and real estate industries--would significantly improve the estimates for these important sectors.

Finally, there are certain categories of services where no comprehensive data are available. Extension of the economic censuses to cover agricultural services, railroads, and airlines would significantly improve these estimates, but initially would probably increase revisions in the existing historical data.

Investment.--The largest source of revisions in investment spending is from revisions to inventory investment. Because inventory investment is measured by the change in business inventories (CBI), percentage changes in CBI and revisions in percent changes are not directly measured, but the large revisions in this component account for the large difference between the dispersion in fixed investment and total investment (gross private domestic investment is composed of fixed plus inventory investment). The large size of the revisions in current dollars are evident in table VI.7.

The large revisions in inventory investment are due to a mix of factors including conceptual changes in treatment, revisions in seasonal adjustment factors, the replacement of judgmental projections for the last month of each quarter with preliminary source data, and revisions to preliminary source data. A substantial part of the large dispersion in inventories is due to a change in the treatment of the commodity credit corporation that was

Table VI.7.—Dispersion in Revisions in the Quarterly Changes in GDP and Its Components: 1983–91

[Percentage points]

	Current dollars	Constant dollars
Gross domestic product:		
Advance	1.17	1.25
Preliminary	1.14	1.27
Final	1.15	1.33
Personal consumption expenditures:		
Advance	1.40	1.37
Preliminary	1.41	1.27
Final	1.35	1.30
Durable goods:		
Advance	4.20	3.96
Preliminary	3.86	3.83
Final	3.97	3.95
Nondurable goods:		
Advance	1.74	2.26
Preliminary	1.45	2.10
Final	1.37	2.03
Services:		
Advance	1.37	1.39
Preliminary	1.51	1.38
Final	1.53	1.42
Gross private domestic investment:		
Advance	9.38	9.53
Preliminary	9.62	9.30
Final	9.66	9.32
Fixed investment:		
Advance	3.03	3.74
Preliminary	2.43	3.29
Final	2.77	3.64
Nonresidential:		
Advance	3.67	4.42
Preliminary	3.19	4.07
Final	3.20	4.56
Structures:		
Advance	6.39	5.33
Preliminary	4.64	4.13
Final	4.82	4.06
Producers' durable equipment:		
Advance	4.02	5.21
Preliminary	3.67	5.39
Final	3.89	5.77
Residential:		
Advance	4.84	5.27
Preliminary	4.81	5.11
Final	4.98	5.22
Change in business inventories	...	...
Net exports of goods and services:		
Exports:		
Advance	5.49	5.33
Preliminary	4.72	4.85
Final	5.19	5.67
Imports:		
Advance	8.12	8.92
Preliminary	7.24	9.29
Final	7.56	9.61
Government purchases:		
Advance	3.93	4.63
Preliminary	4.05	4.79
Final	4.05	4.89
Federal:		
Advance	9.09	10.70
Preliminary	9.11	10.49
Final	8.92	10.58
State and local:		
Advance	1.53	1.41
Preliminary	1.69	1.62
Final	1.65	1.60

Based on changes at seasonally adjusted annual rates.

introduced in the 1991 comprehensive benchmark revision. The commodity credit corporation and its purchases were shifted from government enterprises to general government. The shift of this volatile item caused large, but offsetting, revisions in business inventories and Federal government purchases.

The revisions in seasonal adjustment factors for inventories are particularly large both because of the large revisions in the source data and because of the inherent volatility and substantial variations in the year to year patterns of inventory accumulation. Updating seasonal factors for inventories for another years worth of data can significantly change the picture of trend versus seasonal variation.

The largest single source of revisions between the current quarterly estimates of GDP growth is from inventory investment. These first occur between the advance and preliminary estimates, as judgmental estimates for the third month of the quarter are replaced with preliminary estimates based on the Census Bureau's surveys of manufacturing and trade inventories, and as the first estimates of the second month's inventories are revised by the Census Bureau. Further revisions occur as the preliminary estimates for the third month are revised. The surveys of inventories suffer from many of the same problems as the surveys of retail trade: Small sample size, inadequate reporting, and problems in tracking births and deaths of business firms over time. Many of these same problems, as well as lags in obtaining annual data, also plague the annual survey data on inventories and result in substantial annual revisions.

There are also large revisions between the "final" current quarterly estimates of inventories and the latest estimates. These revisions reflect the replacement of monthly survey data with annual survey data. They also reflect the replacement of BEA projections for nonfarm inventories other than manufacturing, merchant wholesale trade, and retail trade. For all but nonmerchant wholesale trade, annual data are incorporated into the "third" annual revision. (For nonmerchant wholesale trade annual data are not available.) More timely annual data could improve the quality of the "early" annual revisions. Annual survey data for nonmerchant wholesalers would be particularly useful in improving the estimates for nonmerchant wholesalers.

Most of the revisions in fixed investment are due to a combination of past improvements in source data and methods and revisions in source data. The revisions in fixed investment, in part, represent past rather than needed improvements. The data as originally published have been revised substantially to reflect improvements in both the current-dollar and constant-dollar estimates. For example, in the last comprehensive revision, improvements in estimating methodology resulted in a 25 percent upward revision in structures primarily to fill a gap in the construction source data for uncovered additions and improvements.

Substantial revisions to the current estimates of nonresidential investment are due to revisions in the monthly surveys of manufacturers' shipments, orders, and inventories, and in the estimates of the value of construction put in place that are mainly related to incomplete reporting.

Large annual revisions are also due to problems related to sample size and births and deaths of firms in the sample universe. Finally, the absence of an annual survey of construction outside of that for State and local government is a major source of error.

Revisions to the current estimates of residential investment primarily reflect the replacement of BEA projections for residential alterations, additions, and improvements with quarterly data from the consumer expenditures survey.

Exports and imports.--Despite the relatively small size of net exports, large revisions to exports and imports cause the dispersion in their current estimates to be large relative to dispersion in the current estimates of GDP. In dollars they are second only to inventories as a source of revisions, and in percents their dispersions are 4 to 7 times the size of the dispersion in GDP. The sources of these revisions include the replacement of judgmental projections for the last month of each quarter with source data, revision of seasonal factors, and improvements in the estimates of international services.

The revisions from the advance to the preliminary GDP estimates that incorporate the merchandise trade data for the last month of each quarter highlight the replacement of judgment with source data. Investigations of the use of econometric methods and other indicator series to supplement or replace judgment did not suggest a better methodology, primarily because of the inherent volatility of the merchandise trade estimates (Hirsch and Mann 1993).

The volatility of the merchandise trade data also result in large revisions to the seasonal adjustment factors for the quarterly estimates, even though there has been a decrease in the number of detailed categories that are seasonally adjusted. The revisions to the monthly merchandise trade data--which are based on almost universal coverage of export and import transactions--are small, but given the divergent trends in imports and exports and differences in patterns from year to year, the updating of seasonals to incorporate additional years accounts for most of the revisions in imports and exports of goods and services.

The revisions to services flows account for a surprisingly large share of the revisions in exports and imports. This is, in part, due to improvements in source data and, in part, due to the incorporation of annual source data where there are no quarterly or monthly source data. During the last decade, there have been a number of improvements in source data for international trade in services that have resulted in substantial revisions in the data on exports and imports as originally published for categories such as travel and passenger fares, education, telecommunications, construction and other business and professional services.

Government purchases.--The main sources of the rather large revisions in government purchases were a change in concept and the replacement of judgmental projections with source data. As noted above, in the last comprehensive revision commodity credit corporation commodity loans were reclassified and caused offsetting revisions in business inventories and

Federal government. This change in treatment accounted for a large share of the very large dispersion on government purchases.

The other major source of revisions is the replacement of judgmental projections with source data. For the Federal government, data from the Monthly Treasury Statement for the third month of each quarter and monthly data on civilian wages and salaries from the OMB replace judgment. For State and local governments, data on government purchases becomes available. The absence of less frequent than annual data on many State and local expenditures can result in large dollar revisions, as quarterly extrapolations of as many as ten quarters are replaced with lagged annual data from the Census Bureau's annual survey of government finances at the time of the second annual GDP revisions.

In BEA's last benchmark revision, the source for State and local government structures was changed to the annual survey of government finances, causing large revisions in levels, but small revisions in quarter-to-quarter changes. The dollar estimates of dispersion in quarterly estimates of State and local government purchases are quite modest, but the 1991 comprehensive benchmark revisions in the levels of these purchases was very large.

Sources of the revisions to national income

Although more attention is generally focused on the product side of the NIPA's, there is keen interest, especially among revenue forecasters, in the income side of the accounts. An example of the importance of income side revisions to Treasury projections of tax receipts is the 1990 revision of the accounts. In 1990, at the mid-session review of the budget, OMB revised upward the projected deficit by over $10 billion as a result of a $58 billion revision in wages and salaries in the NIPA's.

In addition to their importance to revenue forecasters, revisions to national income (and its components that are used to calculate personal income and saving) can significantly change analysts' and the public's view of the adequacy of personal saving, changes in standards of living as measured by real income per capita, the growth in labor income relative to profits, and the adequacy of returns to capital.[4]

Compensation.--The largest dollar revisions in national income are in compensation of employees. Although the relative dispersion of this component is small, since compensation accounts for nearly three-fourths of national

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[4] The revisions discussed here are taken from unpublished BEA analysis of revisions for the 1978-91 period, the "Annual revision of the U.S. National income and Product Accounts," in the Survey of Current Business, July 1994, and data for the 1968-80 period provided to General Accounting Office for their analysis of revisions presented in The Bureau of Economic Analysis Should Lead Efforts to Improve GNP Estimates, 1982.

income, revisions to compensation, especially wages and salaries, account for the largest share of revisions in national income. A large share of the revisions to the final current quarterly estimates of wages and salaries occurs because of the limited coverage of the available source data, which for the private sector are the monthly employment, average hourly earnings, and average weekly hours data from the BLS monthly establishment survey. This survey provides estimates for all employees, with separate figures for production and nonsupervisory workers, and earnings data only for production and nonsupervisory workers. In addition, the earnings data exclude irregular bonus payments. The private sector annual wage and salary estimates are based primarily on BLS "ES-202" tabulations of wages and salaries covered by State unemployment insurance. (The same source also is used for wages and salaries of State and local government employees.)[5]

Another source of revisions in wages and salaries relates to problems in estimating the bonus and other irregular payments not covered by the BLS monthly survey. In addition to covering the earnings of all workers on BLS' monthly survey, separate reporting of these payments from other earnings would significantly improve the accuracy and reliability of BEA's early estimates of wages and salaries.

In terms of dispersion, and in certain years in terms of dollars, revisions to supplements to wages and salaries are larger than those to wages and salaries. These revisions mainly reflect the paucity of current quarter data on these components of income and the long lag before data is available from IRS, HCFA, Census, and trade associations.

Proprietors' income.--The dispersion in proprietor's income, especially farm proprietors' income, is the largest of all the major components of national income. The volatility of farm output and inventories result in large revisions in the data from the Department of Agriculture that are largely based on annual surveys of costs and receipts, and in seasonal adjustment factors.

Large dollar revisions also occur in the nonfarm proprietors' income data. Current quarterly and first annual revision estimates are based on indicators of industry activity and judgmental trends. In the second annual revision, IRS tabulations of noncorporate business tax returns become available. In comprehensive revisions, estimates based on these data are frequently subject to large revisions as new data on tax return misreporting becomes available from audit studies.

Rental income of persons.-- Revisions to rental income of persons between the final current quarterly estimates and the first annual estimates largely reflect the incorporation of more comprehensive data on the expenses of homeownership--mortgage interest, maintenance and repairs, property taxes,

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[5] For a detailed discussion, see American Statistical Association Panel, "A Research Agenda to Guide and Improve the Current Employment Statistics Survey," January 1994.

and insurance. In the second and third annual estimates, data from the biennial American Housing Survey in the number of units and or rents become available. (These data are revised every 10 years based on information from the latest decennial census of population. Recent changes in mortgage markets and their effects on mortgage payments have increased the size of revisions in recent years.

<u>Corporate profits</u>.--Corporate profits are an inherently volatile component of GDP, and early estimates based on source data from the Census Bureau for domestic profits are often revised substantially as are BEA's estimates of rest-of-world profits. Measured in terms of dispersion, corporate profits are second only to farm income in size of revisions in the components of national income. Restorations of previous cutbacks in sample size for the Census Bureau's Quarterly Financial Report, more complete reporting on BEA's surveys of multinational companies, and improved seasonal factors could substantially improve the corporate profits estimates. The quality of the annual estimates could be improved via an increase in resources devoted to processing and editing IRS data on profits used in BEA's annual revisions.

<u>Net interest</u>.--Net interest has been a major source of revisions. In the 1994 annual revision of national income, net interest was revised down by $46 billion for 1993. The revisions, and successive revisions, in net interest reflect the continuous availability of more reliable estimates of both monetary and imputed interest, although there is no reliable direct measure of monetary interest received by persons. The latest estimates are based largely on tabulations of interest flows reported on business tax returns. However, the quality of these estimates, like those of corporate profits, could be improved by improved editing by IRS.

Further research

More research is needed on the revisions of detailed components of the NIPA's. Even though, as Young (1994) noted, there is little improvement in the performance of GDP from the advance to the final estimates, it is quite possible that this reflects offsetting errors in detailed components. Because the components are of great importance to the analysis of current conditions and forecasting, improvements in them would be highly beneficial. In order to do research on the detailed components, a large-scale database that includes both not seasonally adjusted and seasonally adjusted data for each vintage of estimate would have to be constructed and extensive studies performed.

Revisions in the International Accounts and Regional Accounts

Balance of payments accounts

BEA has made two studies of the revisions of the major components of the balance of payments accounts. These were made in 1991 and 1994, and covered the years 1987 to 1989 and 1990 to 1992, respectively. The dispersions of revisions of the components were generally smaller than the dispersion for the current account for both levels and changes for both time periods examined. Both studies also found statistically significant biases (at the 5 percent level of confidence) for some components. The relatively short period studied limits the ability to generalize the findings of the studies.

The first study came to three general conclusions. First, the additional source data available at the time of the first revision led to only modest revisions of the accounts, with no consistent directions of revision. Second, the additional source data available for the first annual revision led to modest downward revisions in the merchandise trade accounts. Third, the changes in definitions, data sources, and estimating procedures introduced at the times of annual revisions led to substantial revisions in services and investment income accounts. (Unlike the NIPA's, which wait for comprehensive benchmark revisions, new definitions are introduced with annual revisions.) The definitional revisions were probably an important underpinning of the bias that was found in some estimates. Additional source data led to only small annual revisions.

The conclusions of the second study echoed the first and third conclusions of the first study. Both studies also made two points about revisions. First, definitional changes that result in revisions do not affect the quality of the estimates; instead, they are made to present information in an analytically more useful way. Second, increases in the availability of source data and improvements in estimating methodologies produce improved estimates and do not indicate continuing problems. Both of these points echo similar points made in studies of revisions in the NIPA's.

Regional accounts

In general, total U.S. levels of personal income are taken from the available NIPA estimates. The preliminary State quarterly estimates are based primarily on the BLS-790 State survey of employment and, for manufacturing, quarterly weekly earnings. The revised quarterly State estimates are based primarily on quarterly wage and salary data from ES-202 payroll tax tabulations. The administrative record data from the ES-202 reports summarize returns that are required of all employers covered by State unemployment insurance law and by the unemployment compensation program for Federal employees. The reports cover 96 percent of all wages and salaries and are thus a virtual census of nonagricultural employment and wages. Annual revisions include the incorporation of additional source data and national-level data from the NIPA's. Beginning with the 1989 estimates, the preliminary annual regional estimates no longer are forced to equal annual NIPA wages and salaries estimates in instances where the NIPA estimates are diverging significantly from the ES-202 wage and salary reports for the first three quarters of the year. This approach has the advantage of incorporating into the regional estimates the more comprehensive set of data, which will soon thereafter be incorporate into the national estimates on the basis of a full four quarters of data.

An evaluation of the State personal income estimates was published by Brown and Stehle (1990). The study included estimates of dispersion similar to those featured in many of BEA's studies of its national accounts. These dispersions are shown in table VI.8. As with the expenditure components of

Table VI.8.—Measures of Dispersion in Quarterly Percent Changes in State Personal Income, 1984:III–1987:IV

[Percentage points]

	Total personal income	
	Preliminary to final	Second to final
United States	0.3	0.3
New England	0.6	0.3
Connecticut	0.7	0.4
Maine	0.7	0.4
Massachusetts	0.7	0.3
New Hampshire	0.9	0.5
Rhode Island	0.7	0.3
Vermont	1.0	0.4
Mideast	0.4	0.3
Delaware	1.0	0.8
District of Columbia	0.6	0.6
Maryland	0.7	0.5
New Jersey	0.5	0.5
New York	0.4	0.3
Pennsylvania	0.4	0.3
Great Lakes	0.2	0.3
Illinois	0.4	0.5
Indiana	0.5	0.5
Michigan	0.6	0.5
Ohio	0.2	0.3
Wisconsin	0.6	0.6
Plains	0.7	1.0
Iowa	1.8	1.9
Kansas	1.0	1.0
Minnesota	0.7	0.8
Missouri	0.5	0.4
Nebraska	1.4	1.8
North Dakota	3.0	2.8
South Dakota	1.7	2.3
Southeast	0.5	0.4
Alabama	0.6	0.5
Arkansas	1.1	0.8
Florida	0.7	0.6
Georgia	0.7	0.5
Kentucky	0.6	0.5
Louisiana	0.5	0.5
Mississippi	0.7	0.8
North Carolina	0.6	0.4
South Carolina	0.5	0.3
Tennessee	0.5	0.3
Virginia	0.7	0.4
West Virginia	0.5	0.2
Southwest	0.5	0.5
Arizona	0.8	0.6
New Mexico	0.4	0.6
Oklahoma	0.8	0.6
Texas	0.6	0.5
Rocky Mountain	0.4	0.4
Colorado	0.3	0.5
Idaho	0.9	0.8
Montana	1.4	1.0
Utah	0.4	0.3
Wyoming	1.5	0.7
Far West	0.5	0.5
California	0.6	0.5
Nevada	0.4	0.5
Oregon	0.4	0.4
Washington	0.6	0.5
Alaska	3.7	2.8
Hawaii	0.7	0.4

gross product in the national accounts, the dispersions of quarterly estimates for the United States as a whole were lower than 7 of the 8 regional estimates for the preliminary quarterly estimates and lower than 5 for the second quarterly estimates. Within regions, the dispersions for most States were larger than those of the regions for both the preliminary and second quarterly estimates. Thus, offsetting errors tended to lower the aggregate dispersions relative to the more localized dispersions.

There was little tendency toward improved performance from the preliminary to the second quarterly estimates for the regions; three regions had smaller dispersions, three were unchanged, and two had larger dispersions. There was more improvement from the preliminary to the second quarterly estimates for individual States; 34 of the 51 (including the District of Columbia) had smaller dispersions for the second estimates.

The study had several principal findings. The major source of revisions in the State estimates was in farm proprietors' income and wages and salaries. Preliminary quarterly estimates tended to be underestimated in fast-growing States and overestimated in slow-growing States. Beginning in 1984, the reliability of the second quarterly estimates was improved by the incorporation of data from employers' payroll tax reports. Finally, annual revisions of personal income were smaller than the quarterly revisions.

As with the national accounts, improvements in the source data offer the greatest possibilities for improvements of the estimates, but these improvements would often require substantial additional resources.

One area for improvement of quarterly source data would be a speed-up in the availability of ES-202 tabulations. A speed up of at least 6 weeks, but preferably 8 weeks, would make the ES-202 data available 3 or 4 months after the reference quarter, a schedule that would result in direct improvement in both the national and State estimates of personal income. Also the collection of information on the timing and frequency of payday and on the value of irregular bonus payments would allow for improvements in BEA's seasonal adjustment methodologies.

Outside Studies of Revisions in the National Accounts

There have been a number of outside studies of revisions in the NIPA's. This section summarizes the major studies and then draws some implications from them.

Summaries

King (1982) compared early estimates of the change in GNP to the second July revision estimates for the period 1970-I to 1977-IV. He found a tendency for earlier estimates of change in GNP to be underestimated, and measurement errors to be sometimes significant at critical points in the business cycle.

Walsh (1985) compared the "flash" and other preliminary estimates of real GNP growth with the latest estimates for the period 1976-I to 1983-IV.[8] He tested an errors-in-variables model and a rational forecast model, and found that the flash estimates and other preliminary estimates provided unbiased forecasts of the latest available GNP growth rates, but with some suggestions of inefficiency.

Mankiw and Shapiro (1986) studied revisions in GNP for 1975-82. Their statistical analysis of the revisions supported "the characterization that the revisions are errors generated by efficient forecasts and reject(ed) the characterization that they are measurement errors." (p.23) They found no evidence of bias, however "there is limited scope for using other observed data to improve the estimate of the underlying value of GNP." (p.25)

McNees (1986) examined revisions in both forecasts of, and estimates of, current- and constant-dollar GNP, and the GNP deflator, for the period 1976-I to 1983-I. He found that, treating the forecasts as part of a continuum that also includes BEA's early estimates, "forecasts made before a quarter begins improve very slightly until the quarter begins. The subsequent improvement comes in two parts: about half comes as the high-frequency (monthly and weekly) data for the quarter become available up until about 45 days after the quarter is ended. The rest of the improvement comes only after several years as very low-frequency (annual or quinquennial) data are collected and analyzed." (p.8) He also noted that "forecasts are more accurate when compared with the earlier, more contemporaneous "actual" data than when compared with the latest revised data." (p.3)

Scadding (1987) examined revisions in real GNP growth for 1974-84 and found some support for the observation error model. He also reported that filtering the early GNP estimates to remove the observation error still leaves a substantial forecast error component.

Mork (1987) used the generalized method of moments and a generalization of the methodology of Mankiw and Shapiro to examine the revisions in estimates of real GNP for the period 1968-IV to 1984-IV. He found that the flash, advance, and preliminary estimates behaved "neither as efficient forecasts nor as observations with random errors. They show a systematic downward bias. ... In contrast, the 75-day (final) estimate appears to be well behaved." (p.173) He also found that the ASA-NBER forecasts of real GNP had some explanatory power in equations explaining revisions.

Siklos (1993) examined various current- and constant-dollar NIPA economic aggregates for the period 1976-I to 1991-I. Using tests for co-integration (that is, equilibrium relationships) and stability, he concluded that "early vintages of data are not always efficient forecasts of final estimates..." (p.4) "...the evidence is not always favorable to the view that preliminary or even early revisions of the aggregates considered are good

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[8] The "flash" GNP was an estimate that BEA published 15 days before the end of the quarter for several years prior to 1986.

predictors of later comprehensive or final estimates." (p.25) He also noted that "One possible reason for the relatively poor performance of early vintages as predictors of final estimates may be the influence of comprehensive revisions in the (NIPA's) and these may actually reflect improvements in the quality of data over time."(p.4) He characterized his findings for GNP as intermediate between those of Mankiw and Shapiro and those of Mork.

Joutz (1993) used the generalized method of moments to examine revisions in current- and constant-dollar GNP and the GNP deflator for the period 1976-I and 1989-IV. The results generally "support(ed) the efficient view of the relationship between preliminary and revised data... The implication(s) of these findings are that (1) the preliminary GNP estimates do not have as great a variance as the revised data and (2) econometric modelers should treat the series as inefficient predictors of macroeconomic activity." (p.6)

Flemming, Jordan, and Lang (1993) examined revisions to real GNP for 1986-91. They found that measurement errors were counter-cyclical in nature. "Estimates of GNP showed substantial bias, loss of efficiency and auto-correlation in the first three monthly estimates after the end of a quarter, and improvement was only apparent at the first annual revision."(p.39) They also found that PCE for services and State and local expenditures were the most important sources of revision, although nonresidential fixed investment, CBI, and net exports were also important.

Implications

The principal implication of the outside studies of revisions and accuracy is that some improvements could be made in early estimates. The strength of this implication is limited by several factors. First, many studies have examined only rather short time periods, often quite far in the past, when estimating methodologies were somewhat different. Second, many of the studies are based on models using simplifying assumptions that are poorly reflective of the way successive estimates of the NIPA's are made. For example, some studies examined revisions of levels, while the NIPA estimates for quarters after 1982 are essentially best-first-difference in nature. Third, changes in methodology and definitions may have introduced systematic elements in revisions that have not been adequately dealt with in some studies. Further, all of the studies have generally dealt with large aggregates: In contrast, revisions are made at fine levels of detail. The studies would have been more informative if they also had included evaluations of components of GDP. Despite these limitations, the outside studies have provided tools that could be used by BEA to further evaluate its revisions.

Some outside observers have suggested that BEA augment its judgmental trend projections with estimates derived from statistical estimating techniques. A BEA study of time-series modeling techniques used to forecast 18 current-account components of the balance of payments found little encouragement for their use (Hirsch and Mann, 1993). In a majority of cases, the published estimates were clearly superior to the time series model's predictions.

Work at the Federal Reserve Board has indicated that monthly modeling techniques offer some advantages over quarterly modeling for current-quarter forecasts. This work might also have applications for estimating missing data in early estimates of the NIPA's.

Also, the finding of some outside observers that the ASA-NBER consensus forecasts had some explanatory power in regressions attempting to explain revisions (for example, Mork, 1987) suggests that econometric techniques may hold some promise as supplements, or inputs, to estimators' professional judgments.

Even though advanced statistical techniques offer no immediate prospect for improvements in early estimates of economic accounts, they probably would provide valuable tools for judgmental estimators' decisions about the values of missing data. Additional resources would be needed to develop these tools; "While a blending of econometric-type techniques with current procedures might prove worthwhile, such a task would not be easy or inexpensive." (Young 1987) One possible means of minimizing the cost of the task would be to "build-in" forecasts and model estimates into the estimation methodologies.

Studies Related to Forecasts

Impact of revisions on forecasts

Relatively few studies have dealt extensively with the effects of revisions of the economic accounts on forecast accuracy.

Rosanne Cole (1969a), in a pioneering study, compared the accuracy of NBER forecasts to successive estimates of the levels of GNP and its major components from 1953 to 1962. She found that, for forecasts of the coming year, accuracy improved as forecasts were made closer to the beginning of the year, and then within the year being forecasted. Forecasts made in the fourth quarter of the year were roughly as accurate as the advance NIPA estimates. Successive annual revisions of the NIPA estimates brought steady improvements in performance, when measured by the latest-available estimates.

Cole (1969b) also reported that using preliminary NIPA estimates reduced the accuracy of the NBER forecasts by an average of about 40 percent. Cole studied the levels of estimates and forecasts of the NIPA's, thus limiting the usefulness of the results because both forecasts and NIPA estimates are generally made on a best-change basis. Also, economic analysts and policy makers are usually much more interested in the pattern of change in the NIPA's over time. Level revisions that leave the pattern unchanged have little impact on analysts' views of how the pattern of change of the NIPA's affects other measures of economic conditions such as unemployment, inflation, and interest rates. Further, some NIPA revisions, such as definitional revisions made at the time of benchmark revisions, change the levels of GNP without having much impact on the analysts' views of how the economy was performing. For example, the inclusion in GDP of a trended, cyclically invariant piece of the previously unmeasured underground economy, at the time of a comprehensive benchmark revision, would affect the levels of gross product in the period covered by the revision without changing the cyclical pattern of behavior of the economy.

Hirsch and Grimm (1983) evaluated the impact of the 1976 benchmark revision of the NIPA's on BEA's quarterly econometric model. They found only moderate effects of the revisions on the model's structural parameters and multiplier properties. The model's within-sample period accuracy was largely unaffected by the revisions. The model's post-sample forecasting accuracy--using mechanical rules for adjustments--was unaffected for one and two quarters ahead. Some gains in accuracy were found in forecasts more than one year ahead. The usefulness of this study is limited because it was confined to one model and one set of revisions. It is unlikely, however, that a similar study will be done again because of the large resource costs required.

McNees (1986) reported on the tradeoff between when forecasts and early estimates of GNP were made and their accuracy. He found that, as the quarter is approached in time, forecasts of percent changes in real GNP become more accurate . Forecasts of the current quarter become more accurate the later in the quarter they were made. Forecasts made late in the quarter are nearly as accurate as the "flash" or advance estimates of the quarter. The early GNP estimates probably represent the limit of accuracy for forecasts because they, like forecasts, attempt to incorporate all the available information about economic conditions. Forecast accuracy is greater when evaluated with early estimates of the NIPA's than when evaluated with the latest revised data. This finding was also reported by Cole (1969a).

Fleming, Jordan, and Lang (1993) looked at measurement errors and forecast errors in GNP and its major components in the period 1986 to 1991. They found evidence of both bias and inefficiency in the estimates and argued that these led to forecast inaccuracy. The shortness of the period examined, and the use of levels rather than changes limit the ability to generalize their findings. The tests they did to examine inefficiency in the estimates are likewise limited.

A comparison of GNP forecasts with GNP estimates

It is possible to compare data on forecast accuracy published by McNees (1986, 1992) and data on the reliability of GNP estimates by Young (1987, 1993). There are two caveats about this comparison. The periods reported by the two sources are only roughly the same. The vintages of the latest available estimates of GNP are not identical in the two studies. Nevertheless, some observations to be made.

Table VI.9 compares the various vintages of GNP forecasts and estimates for two periods, the earlier from the mid-1970's to the mid-1980's, and the other from the mid-1980's to 1991. The dispersion of both current- and constant-dollar GNP estimates showed no trend of improvement from the advance to the preliminary to the final estimates of the most recent quarter. (As reported by Young [1994], the "flash" estimates, ... had about the same dispersion as the advance estimates.)

In contrast, the dispersion of forecasts of the current quarter decreased sharply from forecasts made early in the quarter to those made late in the quarter. The dispersion of the late-quarter forecasts was only moderately larger than that of the advance estimates. McNees attributed the improvements in forecasts to the incorporation of increasing amounts of information about current economic conditions as they became available during the quarter.

Despite the statements by some observers (for example, Fleming et al, 1993) that forecasts or NIPA estimates are declining in accuracy as time goes on, both forecasts and estimates showed no tendency toward a deterioration in accuracy from the earlier to the later period. The more recent years' performance appears to be better in the table, but this is not conclusive. The reduction in dispersion in the more recent period reflects the different vintages of estimates of GNP used as the standard. All NIPA data after 1982 are still subject to one or more comprehensive benchmark revisions. Young (1987) has reported that NIPA estimates' reliability improved from the 1950's to the 1970's, but have shown no particular trend thereafter.

Statistical Discrepancies as Indicators of Error

NIPA's

The statistical discrepancy is thought by some analysts to provide an indication of the error in current-dollar GDP. It is the difference between GDP estimated as the sum of final sales and change in inventories (that is, the product side) and the sum of factor and nonfactor charges against GDP (that is, the income side). Over the last 10 years the discrepancy has averaged 0.3 percent of GDP. This discrepancy reflects errors in the measurements of both sides of the NIPA's. However, given the relative reliability of the source data used to prepare the product and income estimates, the error is most likely due to errors in the income side estimates.

Two factors limit the usefulness of the discrepancy as an indicator of errors. First, some errors on the two sides of the account are not independent. The same source data underlies portions of both sides of the account. Second, in preparing estimates, BEA makes adjustments that limit the size of the statistical discrepancy. Annually, such adjustments are rare. Quarterly, they may reduce the average absolute change in the statistical discrepancy by as much as one-half.

There is no conclusive evidence that the product-side change will be revised in the direction of the income-side change when there is a large swing in the statistical discrepancy. Over spans of one to several quarters, the swing in the statistical discrepancy anticipates the direction of the revision in the change in the product-side estimate of GDP no more than 60 to 70 percent of the time.[7]

Table VI.9.--Dispersion in Revisions in Estimates and Forecasts in the Quarterly Change in GNP
(Percentage points)

Revisions in BEA Estimates			Revisions in a Sample of Forecasts		
	GNP	Real GNP		GNP	Real GNP
Study	Young (1987)		Study	McNees (1986)	
Period	1978-I to 1986-IV		Period	1976-I to 1984-I	
Advance	1.7	1.5	Early quarter	3.9	3.0
Preliminary	1.5	1.4	Mid-quarter	2.9	2.3
Final	1.5	1.5	Late quarter	2.3	1.8
Study	Young (1993)		Study	McNees (1992)	
Period	1983-I to 1991-IV		Period	1986-I to 1991-III	
Advance	1.17	1.25	Early quarter	1.9	1.8
Preliminary	1.14	1.27	Mid-quarter	1.7	1.6
Final	1.15	1.33	Late quarter	1.3	1.4

[7] See for example, Weale (1992).

Some analysts have suggested that averaging the income- and product-side estimates might produce more reliable estimates. Studies by BEA, using a variety of weighting schemes, have indicated that only trivial reductions in revisions could be achieved.

Balance of payments

Statistical discrepancies in the balance of payments--the difference between the sum of items in the current account and the sum of items in the capital account--have also been used accounts as quantitative indicators of errors. However, like revisions, the size of the statistical discrepancy may or may not be an indicator of errors. For example, a large statistical discrepancy between the current account and the capital account in the balance of payments may simply reflect differences in timing between the delivery of goods and services and the payment for those goods and services. Alternatively, a small statistical discrepancy may simply reflect offsetting errors rather than the absence of errors.

However, large and persistent statistical discrepancies of the same sign do suggest a significant problem with the accounts. An example was the mounting U.S. and world statistical discrepancy in the balance of payments accounts in 1989 and 1990. In 1990, the statistical discrepancy in the United States between the current account and the capital account was reported at $73 billion. A statistical discrepancy of such unprecedented size was particularly troubling at this time. After a decade of large recorded net capital inflows, lower rates of return and increased uncertainty about the U.S. economy appear to have combined with increased credit needs abroad to reduce the supply of capital to the United States. The resulting large drop in recorded net capital inflows was not matched, however, by a similar drop in the current account. If the current-account deficit was correct, the United States must still have been borrowing large sums from abroad to finance its deficit in goods, services, income, and unilateral transfers. Thus, at a time when considerable analytical interest was focused on the availability of capital, in particular whether the economy was in the midst of a credit-crunch-induced recession, the large statistical discrepancy made it difficult to determine whether the supply of foreign capital to the U.S. had indeed been reduced.

International Comparison of Revisions

Only a few studies comparing the size of revisions of economic aggregates across nations have been made. Frank de Leeuw (1990)--then BEA's Chief Statistician--made a comparison of revisions in GNP/GDP in various countries and compared them to comparable estimates for the United States. Table VI.10 includes data from his article as well as other sources. He found that "U.S. revisions compare quite favorably with those of other countries." (p.196)

The main source of information for de Leeuw's comparison was a study by the Organisation for Economic Co-operation and Development that covered the periods 1966 or 1971 to 1975. It found that revisions in quarterly gross product growth in Canada, Japan, Australia, West Germany, and the United Kingdom were all distinctly higher than those in the United States. The revisions were measured from initial estimates to the first estimates that used annual data. Average absolute revisions for the United States were one-third to two-fifths as high as those for the other countries.

As de Leeuw also reported, an internal study by Statistics Canada for revisions from preliminary estimates to comprehensive revision estimates showed the same average absolute revisions as those of the U.S. estimates for the period 1968-84. A study by the Australian Bureau of Statistics, using the same basis and absolute revisions, found revisions more than twice as large as those of the United States for the period 1971-80. A study of British accounts revisions found that the standard deviation of revisions of the four-quarter growth rate from preliminary estimates to twenty quarters later was about twice as high as that of the United States for 1971-79.

A recent study by David Wroe, of Britain's Central Statistical Office (1994), also calculated some revision statistics for recent years for several economic aggregates, including GDP. They are also shown in table VI.10. The British estimates have largely closed the accuracy gap with the United States. For 1984-93, revisions in the British estimates were only one-fifth to one-fourth larger than the corresponding revisions in the U.S. estimates.

Patterson and Heravi (1991a, 1991b, 1992) have published several studies of revisions of the British economic aggregates, but their reported results are readily compared with U.S. revision statistics. Also, a study by Demotes-Mainard and Bournay (1994) of revisions in the French national accounts is primarily descriptive of the development of the accounts, and does not contain data that permit comparison of reliability with the U.S. accounts.

Implications

This review of revisions and other statistical indicators of quality suggests several possible areas for improvement in BEA's economic accounts:

o *New and expanded surveys: One of the largest sources of revisions is the incorporation of more comprehensive source data. Although in terms of dollars, time, and respondent burden, new and expanded surveys are the most difficult improvements to undertake, ultimately they are the only means of securing lasting and fundamental improvements in the accounts. As detailed above, the needed surveys include new quarterly surveys of State and local government purchases, consumer spending on medical care and other services, and international trade in selected services; expansion of the Census Bureau's annual survey programs to cover all nonfarm industries (especially the annual services survey to cover all services); and the redesign of the monthly establishment surveys to provide hours and earnings for all workers and the collection of separate data on bonus payments. (To fill gaps in coverage not revealed by revisions will require the introduction of new surveys of international trade in financial services, of construction prices, and*

Table VI.10.--Comparison of GNP/GDP Revisions in the United States and Selected Other Countries
(Percent change)

Country	Time Period	Revision Measure	Revision Span	Revision
Canada	1966-75	Average absolute revision quarterly rate	Preliminary to first annual	0.59
Britain	1966-75	Same	Same	.77
United States	1966-75	Same	Same	.23
Japan	1971-75	Same	Same	.73
Australia	1971-75	Same	Same	.75
West Germany	1971-75	Same	Same	.56
United States	1971-75	Same	Same	.14
Canada	1968-84	Average absolute revision annual rate	Preliminary to comprehensive revision	2.2
United States	1968-84	Same	Same	2.2
Australia	1971-80	Same	Same	4.0
United States	1971-80	Same	Same	1.8
Britain	1971-79	Standard deviation of revisions, four-quarter growth rate	Preliminary to twenty quarters later	1.4
United States	1971-79	Same	Same	.8
Britain	1984-93	Mean absolute revision quarterly rate	First to second estimates	.18
United States	1984-93	Same	Same	.14
Britain	1984-93	Mean absolute revision annual rate	First to third annual revision	.77
United States	1984-93	Same	Same	.64

Sources: See text.

of new financial instruments.)

- *Improvements in existing surveys: Restorations of cutbacks in sample sizes and or mandatory reporting on Census Bureau monthly surveys could significantly improve BEA's estimates. Other possible improvements include more frequent updating of samples for births and deaths of firms, development of "bias" adjustments by the source data agency, and expedited processing of key monthly surveys used for net exports, inventories, and Federal Government purchases.*

- *Improvements in BEA estimating methods: Although there are limits to possible improvements, because revisions to seasonals are one of the leading sources of revisions, use of alternative seasonal adjustments should be explored. In addition, as part of the re-engineering of its information technology and estimation systems, BEA should consider building in estimates from models and forecasts as explicit edit checks for reviewing estimates for key components where judgmental projections are used.*

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MID-DECADE STRATEGIC REVIEW

OF BEA'S

ECONOMIC ACCOUNTS

Background Papers

Paper VII: A Consolidated Menu of Proposals to Maintain the Accuracy, Reliability, and Relevance of the Economic Accounts

Bureau of Economic Analysis
Economics and Statistics Administration
United States Department of Commerce

U.S. DEPARTMENT OF COMMERCE
BEA
BUREAU OF ECONOMIC ANALYSIS

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VII. A Consolidated Menu of Proposals to Maintain the Accuracy, Reliability, and Relevance of the Economic Accounts

Overview

There are many ways to improve the estimates of the national, international, and regional economic accounts of the United States. Some improvements would reduce the size of revisions in the initial monthly and quarterly estimates of these accounts, some would improve the overall quality of the quarterly as well as annual estimates, and others would improve the timeliness of these estimates. Yet others would improve the relevance of the estimates to the analysis of issues in a rapidly changing economy.

In terms of implementation, some improvements would require the expansion of existing surveys, some would require new surveys, some would require legislation to allow increased data sharing between statistical agencies, and others would require the development by BEA and other agencies of improved estimating techniques.

This paper presents a consolidated list of the proposals for improvements of the national, regional, and international accounts compiled from the papers about changes in the economy, outside experts' evaluations, changes in source data and estimating methods, the new international guidelines, and revision and related studies. The list is broken into four sections: A list of proposals designed to improve the accuracy and reliability of key components, organized around the vintage of the estimates--monthly, quarterly, annually, and benchmark; a list of proposals to improve the relevance of the accounts, such as changes in the structure of the accounts; a list of proposals that relate to data sharing and classification; and a list of proposals about BEA research and other initiatives. Most items are followed by the estimate, or estimates, the recommendation would most directly improve and the agency, or agencies, that would take the lead in implementing the improvement.

Proposals to Improve the Accuracy and Reliability of Key Components[1]

Initial estimates of monthly personal income and outlays

- To improve the accuracy of, and reduce revisions to, initial estimates, restore cutbacks in sample size of the monthly survey of retail trade and improve response rates either through improved follow-up procedures or move to a mandatory reporting system. PCE--(Census).

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[1] The following specific proposals do not discuss improvements in the following BEA programs: regional multipliers and projections that are carried out using the regional estimates, the composite indexes of economic indicators, and the analysis of foreign direct investment in the United States and U.S. direct investment abroad.

- o To improve the accuracy of, and reduce revisions to, initial estimates, expand the monthly establishment survey to provide hours and earnings estimates for all workers and to provide separate data on irregular bonus payments; coverage at present is limited to production and nonsupervisory workers and excludes the bonus payments. Wages and salaries and PCE--(BLS).

List of Abbreviations

Economic Accounting: Components, totals, and accounts

CBI	change in business inventories
GDP	gross domestic product
GSP	gross state product
GPO	gross product originating
I-O	input-output
NIPA's	national income and product accounts
PCE	personal consumption expenditures
PDE	producers' durable equipment

Agencies and Organizations

BEA	Bureau of Economic Analysis
BLS	Bureau of Labor Statistics
DOL	Department of Labor
FRB	Federal Reserve Board
HCFA	Health Care Financing Administration
HUD	Housing and Urban Development
IRS	Internal Revenue Service
OECD	Organisation for Economic Co-operation and Development
OMB	Office of Management and Budget
USDA	United States Department of Agriculture

Initial estimates of monthly trade in goods and services

- o To improve the accuracy of the monthly goods estimates, develop estimates of the full value of computer software. Exports and imports of goods--(Census, Customs, and BEA).

- o To reduce revisions in the monthly (and quarterly) service estimates, develop extrapolation methods that build upon new quarterly and annual services surveys (see below) and explore use of new estimating and revision methods that more fully utilize information on the pattern of revisions across months, quarters, and years. Service exports and imports--(BEA).[2]

Advance quarterly GDP estimates (including corporate profits)

- o To improve the accuracy of initial and all subsequent estimates, introduce regular updates of the progress patterns for single-family residential construction; the present pattern is based on data from the 1970's. Structures--(Census).

- o To improve the accuracy of, and reduce revisions to, advance GDP estimates:

  - Restore and/or increase the sample size and move to mandatory reporting for the monthly Census Bureau surveys of manufacturers' shipments, orders, and inventories, value of construction put in place, merchant wholesale trade sales and inventories, and retail trade sales and inventories. PCE, PDE, structures, and CBI--(Census).

  - Restore and increase the sample size for the Quarterly Financial Report. Corporate profits--(Census).

  - Improve the reporting and coverage of the monthly survey of nonresidential construction. Structures and government purchases --(Census).

  - Speed up the availability of quarterly balance of payments estimates of trade in goods for use in estimating GDP. Net exports of goods--(BEA).

  - Speed up the availability of monthly tabulations of residential use of electricity so that 1 month of data is available. PCE--(EIA).

  - Speed up availability of the Monthly Treasury Statement data so that the third month is available for all quarters. Government purchases--(Treasury).

  - Speed up availability of monthly civilian Federal Government wages and salaries. Government purchases and wages and salaries--(Office of Personnel Management)

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[2] Because preliminary results from the new quarterly surveys will probably not be available until the first revision of the quarterly balance of payments estimates and complete results until the first annual revision, this item appears under the sections for the monthly, quarterly, and annual revisions.

- Prepare special tabulations of shipments of military sales included in merchandise exports series to permit BEA to insure complete coverage. Net exports of goods and services--(Census).

- Extend ongoing work on methodological improvements, including improving seasonal adjustment factors, working with source data agencies to develop bias adjustments, and using statistical projections and other indicator series as explicit edit checks for reviewing estimates for components where judgmental projections are used. Seasonal adjustments and key components of GDP--(BEA).[3]

- Develop extrapolation methods that build upon new quarterly and annual surveys (see below). PCE, Government purchases, service exports and imports, CBI, corporate profits, and personal income dividends--(BEA).[4]

- Speed up the availability of estimates for key components through redesign of processing and data transfer systems. CBI, government purchases, and net exports--(BEA).

o To improve the accuracy of the constant-dollar GDP estimates:

  - Develop nonresidential construction price indexes using model pricing or hedonic index pricing to replace presently used indexes, which are primarily cost indexes based on private firms estimates. Structures, government purchases, and GPO by industry --(BEA and Census).

  - Expand and improve the treatment of quality change in elements of the consumer price index, producer price index, and international price index programs; presently, quality change is captured for only a small number of elements. All GDP components and GPO--(BLS).

  - Develop price indexes for purchases by State and local governments; presently, elements of the consumer price index and the producer price index are used. Government purchases--(Census and BLS).

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[3] Because revisions in seasonals, sample bias, and judgment affect the estimates throughout the estimation cycle, this item is repeated in each of the sections on quarterly and annual revisions.

[4] Because preliminary results from the new quarterly surveys (see below) will probably not be available until one quarter after the "final" estimate for GDP, and complete results until the first annual revision, this item appears under the sections for each of the quarterly and annual revisions.

- Expand the coverage of the producer price index and the international price index to include business services and prepare a special general business overhead index covering "typical" overhead expenses, excluding depreciation and labor costs; presently, BEA-prepared cost indexes are used. PCE, net exports, government purchases, and GPO--(BLS).

- Speed up the availability of quarterly balance of payments estimates of trade in goods used in estimating constant-dollar GDP through redesign of processing and data transfer systems. Net exports of goods--(BEA).

Initial quarterly estimates for the balance of payments accounts

o To improve the accuracy of the initial estimates, conduct the following quarterly surveys for which only annual data are now available:

  - Trade in selected services, both financial and nonfinancial, with unaffiliated foreigners--(BEA).

  - Trade in selected services, both financial and nonfinancial, between multinational companies and their affiliates--(BEA).

  - To reduce revisions in the quarterly (and monthly) estimates, develop extrapolation methods that build upon new quarterly and annual services data and explore use of new estimating and revision methods that more fully utilize information on the pattern of revisions across months, quarters, and years. Service imports and exports--(BEA).

o To improve the accuracy of, and reduce revision to, initial estimates:

  - Speed up the availability of more complete tabulations of U.S. direct investment income abroad and foreign direct investment in the United States--(BEA).

  - Speed up the availability of Canadian and Mexican travel data--(BEA).

  - Prepare special tabulations of shipments of military sales included in merchandise exports series to permit BEA to insure complete coverage. Net exports of goods and services--(Census).

Initial quarterly estimates of State personal income

o To improve the accuracy of, and reduce revisions to, initial estimates, expand the monthly establishment survey to provide hours and earnings estimates for all workers and to provide separate data on irregular bonus payments; coverage at present is limited to production and nonsupervisory workers and excludes the bonus payments. Wages and salaries--(BLS).

- o Speed up the availability to BEA of monthly Civilian Federal government wages and salaries. Wages and salaries--(Office of Personnel Management).

Revised quarterly GDP estimates (preliminary and final)

- o To improve the accuracy of the revised estimates, conduct the following quarterly surveys for which only annual data are now available:

  - Health care expenditures. PCE--(Census).

  - Expenditures by State and local governments. Government purchases--(Census).

  - Trade in selected services, both financial and nonfinancial, with unaffiliated foreigners--(BEA).

  - Trade in selected services, both financial and nonfinancial, between U.S. parent companies and their foreign affiliates--(BEA).

  - Trade in selected services, both financial and nonfinancial, between U.S. affiliates of foreign companies and their foreign parent--(BEA).

  - Expand the <u>Quarterly Financial Report</u> to cover construction, transportation, communications, utilities, and insurance and collect data on dividends received. For these industries, comprehensive quarterly source data are not available. PCE, CBI, corporate profits, and personal income dividends--(Census).

  - Develop extrapolation methods that build upon these new quarterly surveys. PCE, government purchases, service exports and imports, CBI, corporate profits, and personal income dividends--(BEA).

- o To improve the accuracy of, and reduce revisions to, preliminary and final estimates:

  - Speed up the availability of quarterly tabulations of selected items from the consumer expenditures survey; the most important elements are home improvements and repairs, auto repair, gasoline, motor vehicle leasing, and recreation. PCE and structures--(Census and BLS).

  - Speed up the availability of quarterly State and local governments data from the Employment Cost Index so that the data is available for all quarters. Government purchases and wages and salaries--(BLS).

- Speed up the availability of more complete tabulations of U.S. direct investment income abroad and foreign direct investment in the United States. Corporate profits and net interest--(BEA).

- Speed up the availability of Canadian and Mexican travel data. Services exports and imports--(BEA).

- Speed up the availability of quarterly tabulations of State sales tax collections. Indirect business tax--(Census).

- Speed up the availability of quarterly financial reports on commercial banks and insured savings institutions. Corporate profits and net interest--(FRB).

- Speed up the availability of estimates for key components used in estimating constant dollar GDP and price indexes through redesign of processing and data transfer systems. CBI, government purchases, and net exports--(BEA).

- Extend ongoing work on methodological improvements, including improving seasonal adjustment factors, working with source data agencies to develop bias adjustments, and using statistical projections and other indicator series as explicit edit checks for reviewing estimates for components where judgmental projections are used. Seasonal adjustments and key components of GDP--(BEA).

First revision to quarterly State personal income estimates

o Develop a system for preparing seasonally adjusted wages and salaries from quarterly tabulations of wages and employees covered by unemployment insurance to overcome variability due to irregular bonus payments and pay days in these tabulations. Wages and salaries--(BEA and BLS).

First balance of payments accounts revision (annual and quarterly estimates)

o To improve the accuracy of the quarterly (and monthly) estimates, conduct the following quarterly surveys for which only annual data are available:

  - Trade in selected services, both financial and nonfinancial, with unaffiliated foreigners--(BEA).

  - Trade in selected services, both financial and nonfinancial, between multinational companies and their affiliates-- (BEA).

  - To reduce revisions in the quarterly (and monthly) estimates, develop extrapolation methods that build upon new quarterly and annual services data and explore the use of new estimating and revision methods that more fully utilize information on the pattern of revisions across months, quarters, and years. Service imports and exports--(BEA).

First annual GDP revision (annual and quarterly estimates)

- o To improve the accuracy of the first annual estimate, conduct the following quarterly surveys (or expand coverage for existing surveys) for which annual data are not available until the second annual revision:

  - Health care expenditures. PCE and other labor income--(Census).

  - Expenditures by State and local governments. Government purchases--(Census).

  - Trade in selected services, both financial and nonfinancial, with unaffiliated foreigners. Services exports and imports--(BEA).

  - Trade in selected services, both financial and nonfinancial, between multinational companies and their affiliates. Services exports and imports--(BEA).

  - Expand the _Quarterly Financial Report_ to cover construction, transportation, communications, utilities, and insurance and collect data on dividends received. For these industries, preliminary comprehensive annual source data are not available until the second annual revision and final estimates until the third annual revision. PCE, CBI, corporate profits, and personal income dividends--(Census).

  - Develop extrapolation methods that build upon these new quarterly surveys. PCE, Government purchases, service exports and imports, CBI, corporate profits, and personal income dividends--(BEA).

- o To improve the accuracy of, and reduce revision to, the first annual GDP estimates:

  - Provide preliminary tabulations of sales for selected industries from the annual retail trade survey; presently, the data are not available until the second annual revision. PCE--(Census).

  - Expand the coverage and improve the quality of preliminary tabulations from the service annual survey; the presently available tabulations have differed substantially from the final tabulations, which become available for the second annual revision. PCE--(Census).

  - Provide more accurate and complete preliminary tabulations from _Governmental Finances_; presently, not all States are covered in the preliminary tabulations and there have been substantial differences from the final tabulations that become available for the second annual revision. Government purchases--(Census).

- At the time Census monthly series are benchmarked to annual series, adjust as necessary the estimates for all periods since the last benchmark to incorporate up-to-date information on the effects of births and deaths. Such adjustments are now made only when the series are benchmarked to the quinquennial census data and substantial biases, or "drifts," have developed. PCE, PDE, CBI, and GPO--(Census).

- Provide annual State-level tabulations of interest, dividends, and pensions paid from IRS information returns (Forms 1099 series); no direct source data for these payments are available. Net interest, personal interest income, personal dividend income, and pension incomes--(IRS).

- Extend ongoing work on methodological improvements, including efforts to reduce revisions as seasonal adjustment factors are updated, to work with source data agencies to develop bias adjustments and annual updates of sample frames, and to use statistical projections and other indicator series as explicit edit checks for reviewing estimates for components where judgmental projections are used. Seasonal adjustments and key components of GDP--(BEA).

First annual State personal income revision (annual and quarterly estimates)

o Maintain a sample size adequate to provide State data from the farm cost and return survey; reductions in sample size have limited the availability of data on all States. Farm proprietors' income-- (USDA).

o Provide annual State-level tabulations of interest, dividends, and pensions paid from IRS information returns (Forms 1099 series); no direct source data for these payments are available. Personal interest income, personal dividend income, and pension incomes--(IRS).

Subsequent annual revisions to balance of payments accounts

o Conduct studies to prepare estimates of the underreporting on export and import documents. Goods--(Customs and Census).

o Prepare periodic benchmark estimates of low value export and import documents. Goods--(Census).

o Conduct regular benchmark surveys of portfolio investment; there was a 50-year gap before the 1994 survey. Services and incomes--(Treasury).

o Fully incorporate results of benchmark surveys of foreign direct investment in balance of payments time series. Investment income, services, capital flows, international investment position--(BEA).

Second annual GDP revision

o To improve the accuracy of the second revision estimates and reduce revisions to the third annual estimates:

- Restore the sample size of Governmental Finances and provide final tabulations in time for the second annual revision. Government purchases--(Census).

- Improve the editing of preliminary corporate Statistics of Income tabulations to reduce revisions when final tabulations are available for the third annual estimate. PCE, CBI, corporate profits, capital consumption allowances, and net interest--(IRS).

- Restore the American housing survey as an annual survey (it is now conducted every other year), provide State-level tabulations, publish "overlap" tabulations when the survey is benchmarked so time-series estimates can be prepared, and publish the number of units derived directly from the survey. PCE, rental income of persons, and GPO (Census and HUD).

- Increase the availability of accurate source data on fringe benefits. Collect dollar values for employer contributions to a wide range of employee benefit plans, including salary reduction plans, that is, Section 401(k) plans, health insurance, life insurance, education, etc. Tabulate 401(k) contributions from the W-2 form. Speed up the availability of, and continue to improve, the quality of the annual tabulations of data from the IRS form 5500 series to provide data on contributions, benefits, and income of pension and profit sharing plans. (Improvements should include some redesign of the form and clarifying instructions.) Explore Census collection of the HCFA surveys on health insurance in order to increase comparability to related source data. PCE, other labor income, and corporate profits-- (BLS, Social Security Administration, DOL, IRS, and HCFA).

- Speed up the availability of tabulations of annual survey of manufactures data in economic census years; in recent census years, the tabulations were not available. PDE and CBI--(Census).

- Extend ongoing work on methodological improvements, including efforts to reduce revisions as seasonal adjustment factors are updated, to work with source data agencies to develop bias adjustments and annual updates of sample frames, and to use statistical projections and other indicator series as explicit edit checks for reviewing estimates for components where judgmental projections are used. Seasonal adjustments and key components of GDP--(BEA).

- o To improve the accuracy of the second revision estimates and reduce revisions for the benchmark estimates:

  - Expand the coverage of the service annual survey to include all service sector industries covered in the 1992 Economic Censuses and provide additional industry detail for all industries. PCE and GPO--(Census).

  - Conduct an annual survey of construction industries similar to the annual survey of manufactures to provide annual benchmarks for the monthly construction put in place survey; presently benchmarks can be prepared only every 5 years. Structures, CBI, compensation of employees, rental income of persons, and GPO--(Census).

  - Conduct an annual survey of nonmerchant wholesalers. The present annual wholesale trade program omits this important part of wholesale trade. CBI and GPO--(Census).

  - Cover sales or receipts of nonemployer firms in all annual Census establishment-industry surveys: Present surveys of retail and services assume that data reported by firms with paid employees are representative of nonemployer firms; present manufacturing and merchant wholesale trade surveys do not include nonemployer firms. PCE, structures, PDE, CBI and GPO--(Census).

  - Expand the annual retail trade survey and the service annual survey to collect data on sales by merchandise line and type of service; presently, these data, which provide direct information on the product composition of consumer spending, are available only every 5 years. PCE and GPO--(Census).

  - For industries covered in the service annual survey where nonprofit organizations predominate, collect total operating expenses to provide for a direct measure of the output of these organizations as measured in the national accounts. PCE and GPO--(Census).

  - At the time Census monthly series are benchmarked to annual series, adjust as necessary the estimates for all periods since the last benchmark to a quinquennial census up-to-date information on the effects of births and deaths. Such adjustments are now made only when the series are benchmarked to the quinquennial census data and substantial biases, or "drifts," have developed. PCE, PDE, CBI, and GPO--(Census).

  - Increase the sample size of annual capital expenditures survey to improve the accuracy of expenditures by type, which are needed to prepare constant-dollar estimates of investment. Expand the survey to collect information, not available elsewhere, on expenditures for software--to treat these expenditures consistently as investment; construction in process--to record expenditures in the proper year; finance leasing--to record related expenditures in the proper industry; and force account investment--to record all such expenditures. PDE, structures, corporate profits, and depreciation--(Census).

- Restore annual oil and gas survey. The trade association survey that provided more comprehensive coverage than the economic census and the extrapolator for annual exploration expenditures has been discontinued--(Census).

o To improve the accuracy of the second revision and all subsequent estimates:

  - Develop improved estimates of calendar-year crop inventories owned by farmers, in part by restoring the annual survey of production, disposition, and value of field crops. Presently, the estimates are, in part, based on crop-year data and quarterly marketing patterns. CBI, and farm proprietors' income--(USDA).

  - Increase the coverage of and convert the timing basis underlying the Federal Procurement System to provide accurate and up-to-date source data for government purchases by type. Government purchases, PCE, and PDE--(OMB).

  - Expand the collection of noninterest income from abroad by U.S. banks and collection of noninterest income from abroad by foreign bank offices in the United States. Net exports--(BEA and Treasury).

  - Extend ongoing work on methodological improvements, including improving seasonal adjustment factors, working with source data agencies to develop bias adjustments and annual updates of sample frames, and using statistical projections and other indicator series as explicit edit checks for reviewing estimates for components where judgmental projections are used. Seasonal adjustments and key components of GDP--(BEA).

Second annual revision of State personal income

o Speed up the availability of geographic area coded data from IRS forms 1040C and 1065 to 15 months past the reference year. Nonfarm proprietors' income--(IRS).

o Restore the American Housing Survey as an annual survey (it is now conducted every other year), publish "overlap" tabulations when the survey is benchmarked so time-series estimates can be prepared and publish the number of units derived directly from the survey. Also, increase the sample size to provide State-level tabulations, Rental income of persons--(Census and HUD).

- Expand the items in the geographic coded IRS individual master file to include tax exempt interest income, pensions and annuities, and tax payments. Interest income, transfer payments, and personal taxes--(IRS).

- Update the geographic coding file used to code IRS files of proprietorship, partnership, and individual income tax returns. Nonfarm proprietors' income, personal interest income, transfer payments, and personal taxes--(Census).

Third annual GDP revision

- To improve the accuracy of the third revision estimates and reduce revisions in the benchmark estimates, revise all Census Bureau annual surveys to reflect updated information on births and deaths. All expenditure components--(Census).

- To improve the accuracy of the third revision and all subsequent estimates:

    - Conduct a supplemental survey as part of the corporate <u>Statistics of Income</u> program or revise the tax returns to provide reliable income and expense detail, such as interest, rent, and pensions. Various income components--(IRS).

    - Restore the sample size of the corporate <u>Statistics of Income</u> program. CBI and various income items--(IRS).

    - Provide tabulations of interest and other types of foreign-source income reported on form 1118 to enable BEA to insure consistency between the IRS and BEA estimates. Net interest and corporate profits--(IRS).

Benchmark GDP and I-O account estimates

- Expand the censuses of construction industries, real estate, and services industries to facilitate benchmarking of monthly construction put in place survey. Structures--(Census).

- Conduct surveys and prepare special studies to provide source data to update BEA estimates of the misreporting on tax returns used to estimate GDP. Census should (1) repeat studies conducted in the 1977 Economic Censuses on the effects of the use of tax return information and (2) prepare periodic exact-match studies using IRS, current population survey, and Social Security Administration data to estimate the effects of nonfiling. IRS should conduct studies evaluating the effectiveness of their taxpayer audit program. Many GDP components and industry output--(Census, BEA, and IRS).

- Expand coverage of the economic censuses to cover all private industries and all businesses in the quinquennial economic census. The present census excludes agriculture services, railroads, airlines, and tax exempt organizations engaged in services activities and the data for most industries cover only businesses with paid employees. Most GDP components and industry output--(Census).

- Provide detailed revenue and expense data for central administrative offices and auxiliaries. Industry output and intermediate use--(Census).

- Expand the coverage of the assets and expenditures survey to cover all industries covered in the economic censuses to provide information on legally required and voluntary supplemental labor costs, capital expenditures, inventories, legal form of organization, purchases of selected services, and costs of goods sold. Most GDP components and intermediate use--(Census).

- Expand the collection of product detail, as needed, in the economic censuses. Product detail provides information on secondary products for the comprehensive measure of industry output and information needed to more accurately measure final expenditures. Most GDP components and intermediate use--(Census).

- Improve the editing of data on beginning-year inventories, cost of materials, and purchased services in the economic censuses. CBI and intermediate uses--(Census).

- Prepare periodic benchmark estimates of low value export and import documents. Goods exports and imports--(Census).

- Extend the coverage of surveys on economic service lives of assets. Corporate profits and capital consumption allowances--(Treasury).

- Conduct an expanded annual capital expenditures survey to benchmark the survey. PDE and structures and corresponding stocks--(Census).

- Expand the collection of detail on plant and equipment expenditures in Government Finances. PCE, PDE, and government purchases--(Census).

- Collect type of purchases detail for State and large city governments in quinquennial census of governments to provide weights for corresponding price indexes and to improve estimates of constant-dollar purchases. Government purchases--(Census).

- Conduct studies to prepare estimates of the underreporting on export and import documents. Goods exports and imports--(Customs and Census).

- Use publicly available microdata base on nonprofit organizations, to improve the classification of these entities in the economic censuses.--(Census)

- Conduct research and develop a methodology to increase the convergence of value added estimates for GDP by industry and for I-O--(BEA).

- Develop a capital flows table based on the 1987 I-O benchmark table to improve NIPA capital stock estimates--(BEA).

- Continue to provide expanded assets and expenditures survey data on a speeded-up basis for production of the I-O benchmark tables on an accelerated time schedule--(Census).

- Develop an I-O benchmark table on a Standard Industrial Classification basis and an I-O basis for the 1992 benchmark to aid in removing inconsistencies between data sets-- (BEA).

Benchmark county personal income estimates

- Collect the following items in the Census of Agriculture and prepare county level tabulations: Depreciation, share rental payments, patronage dividends, cash receipts from grazing and custom feeding of livestock, and cash receipts for additional categories of crops and livestock--(Census).

GPO, GSP, and annual I-O estimates

- Collect detailed expense and related items in the annual survey of manufactures, annual retail trade survey, annual trade survey, and service annual survey including employment, payrolls, legally required and voluntary supplemental labor costs, inventories, legal form of organization, revenues, cost of goods sold, expenses other than depreciation and labor costs, and capital expenditures as needed; for the annual survey of manufactures collect the same detail of purchased goods and services provided in the quinquennial census--(Census).

- For selected establishment industries, collect annual information on direct purchases of imported goods--(Census).

- Prepare annual company-establishment link tabulations to update the information needed to convert company profits to an establishment basis. The last link table was prepared for 1987--(Census).

- Collect total purchased services for all industries in the economic censuses--(Census).

- Expand the sample of annual capital expenditures survey to provide State-level tabulations. Depreciation and capital stock--(Census).

- Expand the quinquennial commodity flow survey to cover additional industries, including the rest of retail trade and services, and construction. GSP--(Census).

- Restore and expand the annual current industrial report programs to obtain the 7-digit detail important to BEA's commodity flow estimates of PDE and PCE--(Census).

- Increase the sample size of the annual capital expenditures survey to improve the accuracy of expenditures by type, which are needed to prepare constant-dollar estimates of investment, and to provide State-level tabulations. Expand the survey to collect information, not available elsewhere, on expenditures for software--to treat these expenditures consistently as investment, construction in process--to record expenditures in the proper year, finance leasing--to record related expenditures in the proper industry, and force account investment--to record all such expenditures. GSP--(Census).

- To improve integration of BEA's I-O and GDP by industry estimates, develop an integrated database system for GDP by industry and I-O, which will permit production of an annual I-O time series based on the latest I-O benchmark--(BEA).

Proposals to Improve the Relevance of the Accounts

National accounts

- To better measure changes in the nature of output, extend BEA's work on quality adjustments through the development of hedonic price measures for high-tech goods--such as semiconductor manufacturing equipment and telecommunications equipment--and services--(BEA).

- To address problems associated with rapidly changing prices, feature a new measure of real output that uses more appropriate base period weights--(BEA).

- To better measure sectors where output is largely intangible, develop new concepts and measures of output. Initial targets include banking, insurance, and other financial services--(BEA).

- To address changes in the composition of output, develop and implement a new economic classification system; that is, the North American Industry Classification System--(Census, BLS, BEA).

- To better and more completely measure the effect of changes in the structure and organization of the economy, move toward the new SNA:

  - Develop clearer, separate, pictures of the nonfinancial and financial activities of nonprofit institutions and households.--(BEA and FRB).

  - Develop a more comprehensive accounting for government (BEA).

  - Better integrate the I-O, national, international, and regional accounts and the sectors within the various accounts (BEA).

- Increase integration between the BEA's nonfinancial accounts and the FRB's financial accounts (BEA and FRB).

o To better measure investment and capital stocks:

- Improve the estimates of computer software and treat software and some other intangibles as investment--(BEA and Census).

- Include government purchases of structures and durable equipment in investment and capital stocks--(BEA).

- Develop improved accounting and measures for contingent claims and other new financial instruments--(BEA, FRB, and Treasury).

- Increase integration between the FRB's flow of funds accounts, including balance sheets, and BEA's NIPA's--(BEA and FRB).

- Improve measures of capital and depreciation through the improved source data and methods including geometric and other depreciation methods and data on depreciation and discard practices and declines in used assets prices--(BEA).

- Extend BEA's work on satellite accounts in the areas of research and development and integrated economic and environmental accounts--(BEA).

International accounts

o To close gaps in coverage associated with internationalization of the economy:

- Expand and increase coordination in the international collection and exchange of data on security, banking, and other transactions that bypass domestic brokers, banks, and other financial institutions--(BEA, Treasury; FRB, IMF, and OECD).

- Complete and institutionalize the portfolio investment benchmarks and other methods for assuring complete coverage of portfolio investment and consistent coverage between portfolio and direct investment--(BEA, Treasury, and FRB).

- Develop new measures of derivatives and other new financial instruments (BEA, Treasury, and FRB).

- Develop new quarterly surveys of rapidly expanding services now covered by BEA's annual-only surveys--(BEA).

- Expand BEA's existing surveys to cover newly emerging gaps in services--(BEA).

- Improve source data and methods to provide better coverage of exports and imports of computer software and other goods and services--(BEA, Census, Customs).

Regional accounts

o To better measure the regional effect of changes in the nature, composition, and organization of output:

  - Extend the improvements in real output measures in the national accounts to the regional accounts--(BEA).

  - Develop updated and improved measures of personal income for use in the regional and national accounts--(BEA).

o To better measure investment and capital stocks:

  - Extend the improvements in investment and capital stock measures in the national accounts to the regional accounts--(BEA).

  - Develop State and regional investment and capital stock measures--(BEA).

o To better measure the regional effect of internationalization:

  - Extend the improvements in the international accounts to the regional accounts, with a special emphasis on the origin of trade flows and the location of foreign affiliates.

Proposals About Data Sharing and Multiagency Classifications

o Enact data sharing legislation such as outlined in the Statistics 2000 report, to improve the consistency and quality of BEA's source data and BEA's use of that source data.

o As part of the effort to improve the Federal Government classification systems:

  - Adopt recommendations to base establishment classifications on input structure and product classification on market (demand) considerations. Improved establishment industry classifications would facilitate the preparation and improve the accuracy of the I-O accounts; improved product classifications would do the same for the current GDP estimates.

  - Develop consistent classifications for the presentation of data on consumer spending. The use of a common system for PCE, the consumer price index, and the consumers expenditures survey would facilitate BEA preparation of the PCE estimates and improve international comparability of data on consumer spending.

- Develop consistent classifications of government functions that are largely unique to government. The use of such a system for government purchases in GDP and for the comparable spending data prepared by Census would facilitate BEA's preparation of its estimates and improve international comparability of data on government spending.

o Incorporate in a comprehensive and consistent manner the new classifications into the statistical programs of Federal agencies. Changes in the following programs will improve the quality of all BEA programs and reduce the time necessary to prepare many of them.

  - Introduce consistent establishment industry coding for all Census and BLS programs. Data from both agencies enter into GDP, GPO, and the I-O accounts.

  - Provide consistent product detail underlying Census and BLS programs. BLS price data are used with Census value data to prepare constant-dollar estimates.

  - The Census Bureau should try to avoid designing its "continuous measurement program" for the decennial population census and related annual surveys in such a manner that data will be collected in different year for different data modules, like housing and journey-to-work. Separation of the interrelated data within these modules will decrease the accuracy of components of GDP and State personal income--Census).

Proposals About BEA's Research and Other Initiatives

o Update and complete BEA methodology papers documenting the sources and methods used to prepare estimates.

o Establish a standing advisory committee.

o Expedite the re-engineering of BEA's information technology system.

o Improve the consistency of the measurement of domestic and rest-of-the-world corporate profits.

o Improve the methodologies for estimating purchases by type of customer for the following:

  - Motor fuel, with BLS, Census, EIA, and the Federal Highway Administration;

  - Electricity, natural gas, and fuel oil, with EIA and Census; and

  - Health services, with HCFA, BLS, and Census.

- With Census, develop improved strategies for the collection of data and estimation of the intermediate use of goods and services by industry (including government). Collection strategies need to take into account company record-keeping practices, including their accounting methods and classifications. Estimating strategies need to be developed for data collected at the company level that may require additional work by Census and BEA to use detailed establishment data. Issues related to "captive" production also need to be addressed.

- Expand BEA's revision analysis program to identify more fully the sources of revision and whether changes in the GDP revision schedule would improve data quality and timeliness.

- Explore the potential use of the Census longitudinal research data base to improve the consistency of estimates based on product detail from the annual survey of manufactures and for improving the estimates of capital stock.

- With the FRB, continue efforts to reconcile the flow of funds and NIPA's and to determine improvements necessary to improve consistency between corresponding estimates of stocks and flows such as those relating to interest.

- For the I-O accounts, BEA should:

  - Explore how to reconstitute the annual I-O account program with the following goals:

    - The accounts should be presented on both an I-O and establishment industry classification basis.

    - The accounts should be a consistent time series benchmarked to both benchmark I-O tables and GDP comprehensive revisions.

    - Annual tables should be available in time for use in the third annual GDP estimate.

    - For all but the most recent years, the establishment-industry based estimates would replace the presently published current GPO series.

- Explore the use of sub-annual data from the Census Current Industrial Reports program to improve the estimates of PDE.

- Explore the need to retime Federal Government budget outlays for services to a delivery basis; currently, such retiming is done only for defense purchases of military equipment.

- Study the conversion of source data collected on a fiscal-year basis to a calendar-year basis. Presently, such conversions are made only to receipts and expenditures of governments; in the 1950's, similar adjustments were made to corporate profits and other components.

- With USDA and Census, study the potential undercoverage caused by the use of activity data to measure the farm sector and establishment industry data to measure the nonfarm sector.

- Study the effects of BEA's use of IRS data in light of the proposed simplification of tax returns. Under some proposals, much data used by BEA or its supplying agencies would be eliminated.

*U.S. GOVERNMENT PRINTING OFFICE: 1995-386-542/22024